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Putting Our House in Order

Need for New Wiring Methods

NOW that we know that any possible action on the part of the Government with regard to the general question of electricity distribution in this country is indefinitely postponed, there is an opportunity to examine methods of distribution at the consumers' end which can be done without waiting for any Government initiative.

It is necessary first to divest our minds of all those circumstances which have grown up to influence present methods of domestic distribution and endeavour to trace briefly their evolution. Then we may perhaps find ourselves in a better position to make some sort of excuse for the present highly unsatisfactory conditions under which the unfortunate domestic consumer is supplied with the means to operate the various electrical appliances in his home.

The Two-circuit System

When "the Electric Light" was first introduced into the home the consumer was not confronted with any problem of separate tariffs for lighting, heating and other purposes. The power tariff, when it came along, brought with it the burden of separate wiring to each power point, separate fuses for each circuit, and the necessity for each circuit to terminate at one plug socket. To-day, even in districts where there is a single rate of charge for the electricity consumed whether for power or lighting purposes, the two circuits for lighting and power are still wired independently and conform to various regulations made necessary only because of the nature of current wiring practice. If the charge for domestic electricity had never been governed by considerations of the use to which the consumer was proposing to put it, but had been uniform for both power and lighting, separate wiring for power and lighting purposes need never have been introduced in the home.

It is true that wiring adequate to carry the load for both purposes would have been necessary, but the cost of this would have been small by comparison with the present expense involved where separate circuits have to be run throughout. Once the conductors are sufficiently generous to carry the full load necessary for the total domestic consumption, house wiring could be simplified to a remarkable extent. All branch circuits could be taken from the same conductors, with parallel connections and fuses incorporated for each separate piece of electrical equipment. One pair of distribution wires could be carried in a suitable conduit run through each living room, and a plug and socket fitted as the requirement arose at any convenient point.

Full advantage is not being taken of one of electricity's greatest "pulls" over gas—the ease with which it can be brought to the point of application: that is, if we except the reprehensible practice of carrying flexible leads from a plug to a position perhaps yards away. For fitting an additional point in a room a charge of two pounds would be not unusual, as the wiring would in many cases have to return to the main fuse box. Such a cost discourages the use of additional electrical equipment in the home.

Even where the consumer would not be troubled about the cost of the additional point, the problem of fixing a new point at some required position in a room recently decorated is more than enough to cause the postponement of the work; but if every room were wired with a complete circuit around, say, the skirting board, with removable covers to the conduit to give access to the wires, the general convenience and ability to increase the number of points would contribute in no small measure to increase the domestic popularity of electricity.

A Possible Solution

This follows the lines of the under-floor duct system which is now being installed in a number of large new buildings. It is really an extension of the rising main idea to the distribution wiring. Actually, we believe, wiring of this kind is already being done to special order by certain electrical contractors, although details are not yet available. The system is not a new one, for we have recollections of an American device of the sort referred to being introduced three or four years ago. It was then extensively advertised, but lately we have seen nothing further of it. So far as we remember it comprised two rigid conductors mounted on some kind of backboard, screened by a grille in which were two practically continuous slots. Connection was made through these slots to the conductors by a special type of fitting.

Such an arrangement might find favour in America because of the lower domestic voltage employed, but one can imagine the possibility of trouble with such a system if the slots were wide enough to admit fingers or even metal objects such as scissors. It would be easy to make provision for covering the

conductors in after the connections had been made at the required points. The possibility of plastic mouldings to accommodate the pair of conductors occurs to us as one which would enable the casing to be neat in appearance, insulated and standardised in sections, and with provision for fitting sockets and plugs or other conductors where necessary. Whatever may be the attitude of those responsible for domestic wiring to such proposals now, we are convinced that the time must come soon when domestic wiring will have to be simplified. The abolition of different tariffs for lighting and power would go a long way to enabling such a simplification to take place. Where only one tariff applies, no contractor, we think, should carry out domestic wiring on the old system of independent power and lighting circuits without first investigating the possibilities of the alternative method we have discussed.

Relief and Opportunity

IT is now certain that there will be no Electricity Distribution Bill this session. Mr. Chamberlain told Mr. Chuter Ede on November 10th that the already heavy programme of legislation would prevent time being found for such a measure. Upon the whole, we think, the decision will be received with relief by the electricity supply industry which ever since the McGowan Report appeared has dwelt in an atmosphere of uncertainty. On a very minor scale the situation may be compared with that which existed when the threat of immediate war was withdrawn a few weeks ago, for the lesson to be learned is a similar one. Just as the nation must reorganise itself to meet changed international conditions so must the electricity supply industry pull itself together to secure the co-operation and efficiency which the times demand. Parish boundaries must not be allowed to stem progress and those undertakings which, with all the will in the world, cannot develop as they should for any reason must not close their minds to suggestions for working arrangements with other, better situated concerns. Much more can be accomplished voluntarily than has yet been attempted.

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Power and Defence

ATTENTION was drawn recently to the danger of a shortage of industrial power in the United States in the event of a national emergency. Swift action has been taken by the Government to meet this situation. It has been announced by Mr. Louis Johnson, Assistant Secretary for War and Chairman of the National Defence Power Committee, that the leading utility companies are to place immediate orders for generating plant and boiler equipment to a total capacity of 1,000,000 kW. The new plant will be installed in the leading industrial areas, and it is possible that financial assistance will be given by the Government in cases of necessity. It is believed, however, that this assistance would merely take the form of advances on favourable terms. The plans provide, moreover, for the interconnection of systems to make up any shortages in particular areas.

Peak Load Plant

CAPITAL charges on the site of a power station so largely influence the cost of generating peak supplies that any development that reduces the physical dimensions of the plant is an important step in the right direction. From this aspect the section of Mr. H. S. Hvistendahl's I.E.E. paper that had most bearing on conditions in Great Britain was his reference to the installation at Oslo, where two 165,000-lb. per hr. "Velox" boilers and a 31,500-kW turbo alternator, with its step-up transformer and switchgear are all accommodated in part of the old boiler house and occupy only two-thirds of the space formerly taken by the boilers alone that were required to serve two 6,000-kW turbo-alternators. So far, only two "Velox" boilers have been put into commercial operation within the Empire—those at Wellington, N.Z., which we described a fortnight ago. A serious drawback is that such boilers depend upon oil-firing. This, no doubt, makes for quick starting, which is an advantage, but is not essential for peak load work in this country.

Emergency Generation

WHILE plant for carrying peaks has often been used as a stand-by as well, the requirements of the two services are not the same. Thus, quick starting becomes a leading consideration in coping with breakdowns and, as operation is as nearly automatic as possible, high pressures and temperatures may be inadvisable. Where, as in this country, the generating stations are comparatively close to the load centres, the provision of stand-by at the point of use in case of failure of the transmission system is rarely justifiable. Moreover, as the generating stations are not far apart, one can call upon another for stand-by *via* the grid or make up the discrepancy by running its sets at their maximum continuous rating of 25 per cent. above the economic rating.

A Rural Example

AN example of co-ordination over a wide area, very largely rural, is provided by the Wessex Company and its associates whose system is dealt with in this issue. Throughout this company's area of 4,000 square miles, of which only 100 square miles is urban, electricity can be obtained on a two-part tariff with a maximum secondary charge of 1d. per kWh. Coupled with this are attractive free-wiring and hire-purchase schemes. The result of this policy is seen in the rise in the per capita consumption from 16 to 61 kWh a year between 1932 and 1937. A thousand towns and villages are now served, and of the 5,800 farms in the area 1,710 have been connected, although many of them are fairly remote from the company's lines. It is doubtful whether legislation would do much to speed up development in such areas as this, where the supply authority is fully aware of its responsibilities—and its opportunities.

Faith and Works

A GOOD illustration was provided by Mr. S. R. Siviour, in his address as chairman of the I.E.E. Transmission Section, of the savings that can ultimately be made in expenditure on high-voltage networks by looking ahead. This, of course, must be coupled with the faith that the demand for electricity in the future will warrant provision being made for it. When the original 11-kV lay-out needed to be supplemented, a 33-kV system was adopted, but the lines were insulated for 66-kV and the transformers were also wound for the two voltages, so that the later change-over to the higher voltage was effected without difficulty as occasion required. The 11-kV lines are still in use and the ability to superimpose a high-voltage on a lower-voltage system indicates the greater value as an asset of transmission and distribution compared with generating plant which is liable to become obsolete at a much earlier date.

Rural Load Building in Wessex

Problems of a scattered population

[*Elec. Rev.* photo.

Yattendon, a typical village served by the Wessex Electricity Co. Care has been taken to preserve its picturesque old-world charm by placing the overhead lines at the rear of the houses

TO supply electricity to an area of almost 4,000 sq. miles, of which urban areas form only about 100 sq. miles, and of which the population is only about 210 to the square mile, is in itself no mean problem. But to do this on a financially sound basis and still be able to keep the "unit" charge of the two-part tariff down to not more than a penny throughout a whole area (with a reasonable fixed charge) appears to present almost insuperable difficulties in the existing stage of development. Yet this is what the Wessex Electricity Co., operating under the direction and control of Edmundson's Electricity Corporation, Ltd., has succeeded in doing in only just over ten years.

Incorporated in 1927 by Act of Parliament (the provisions of which were extended by a further Act the following year), the company undertook to give a public supply of electricity to approximately 4,000 sq. miles covering parts of eight counties—Gloucester, Oxford, Dorset, Somerset, Wiltshire, Hants, Berks and Bucks and bounded on the map roughly by lines connecting Dorchester, Yeovil, Gloucester, Buckingham, Wycombe, Winchester and back to Dorchester.

Originally the company was charged with the duty of taking out development orders for districts not already covered by Electric Lighting Orders, and accordingly it was granted the North Oxford (1928), Mid Wessex (1932), South Wessex No. 1 (1932) and South Wessex No. 2 (1934) Orders. In the remainder of the area covered by the Act supplies were already being afforded by associated undertakings in West Wilts, Abingdon, Cirencester, Wantage, Oxford, Salisbury, Yeovil, Frome, Wilton, Tisbury, Malmesbury, Tetbury, Lymington, Andover, Sherborne, Warminster, Wallingford and Whitchurch (Oxon), and by other authorised undertakings in Swindon, Dorchester, Amesbury, Calne, Marlborough, Witney, Chipping Norton, Burford and Bourton.

A feature of development of the area, in common with similar undertakings in the Edmundson Group, has been the trend towards amalgamation of the associated undertakings, and the operation of the entire group of companies by a single staff. The Malmesbury, Tetbury, Andover, Sherborne, Warminster, Wallingford and Whitchurch undertakings were the first associates to be transferred, these being followed in 1937 and 1938 by the others with the exception of the Salisbury and Wilton undertakings, which still remain to be consolidated. In 1932 as a result of the Corporation of Oxford exercising a purchase option, the local company was deprived of the portion of its undertaking lying within the old city boundary, the remaining part of the Oxford Co.'s undertaking being transferred to the Wessex Co. at the beginning of this year. The Cookham and Thames Valley companies operating in districts adjoining the Wessex Act area, and already associated with the Wessex Co., were taken over in 1937. Of the independent undertakings within the Wessex area, Whitchurch (Hants), Amesbury, Burford, Woodstock, Witney and Marlborough take bulk supplies from the company.

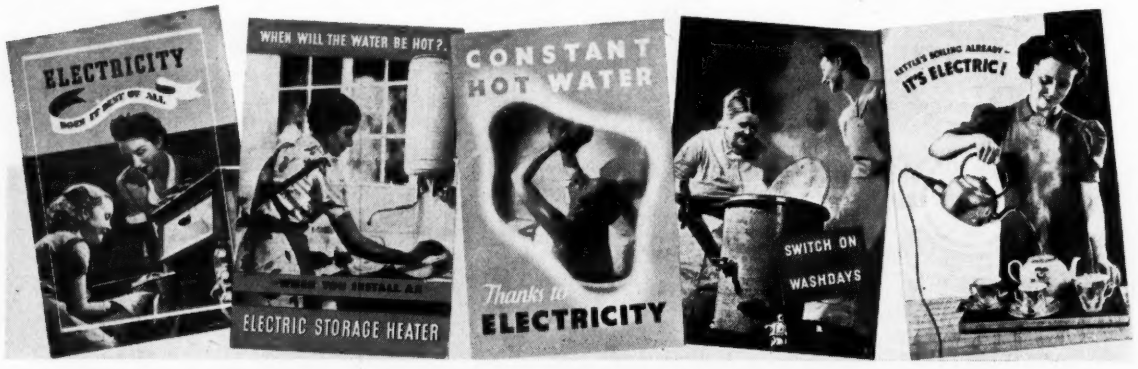
The Wessex and associated companies have distribution and power rights in the area shown in white, with power and bulk rights in the cross-shaded districts

For administrative purposes the area is now divided into seventeen districts. Each of these has its own offices and in addition there are twenty-three branch offices. The latter are also used for collecting accounts, displaying apparatus, contracting work, maintenance, service and wiring stores. The most modern method of machine accounting has been adopted to cope with the rapidly increasing business and by the end of next year all the accounts will be sent out from the central office at Newbury, which is under the managership of Mr. W. E. Brandreth. Customers will, however, still be encouraged to pay their accounts locally so as to establish contact with the showrooms.

All normal engineering work is carried out by the district offices, but for exceptionally large or complicated jobs the advice and assistance of the associated Edmundson's Construction Department is available, so minimising the size of the technical staff required locally. Every district manager, each of whom has his own commercial and engineering assistants, is, however, fully competent to make emergency decisions affecting his own area. In most cases the manager himself has had technical training, but this is not considered absolutely essential, experience and administrative ability being of more importance.

Ten years' work by the company show a remarkable degree of progress towards the ultimate object of making cheap supplies of electricity available to all. Nowhere in the area is it possible for one to be more than about four miles from the mains, and there are now well over a thousand towns and villages receiving supplies of electricity. Development has been particularly rapid in the last five or six years, approximately 765 villages having been connected up since the end of June, 1932. Between December 31st, 1932, and September 30th, 1938, the total number of consumers increased from 43,246 to 118,475, the total connected load rising from 73,457 to 247,213 kW. The peak load in 1937 (41,622 kW) was more than half as much again as it was in 1932

(26,848 kW), while sales of electricity were actually doubled during the same period, the figure for the year ended December 31st, 1937, being 126 million kWh as compared with 53 million kWh for 1932. This means that, excluding power supplies, the average consumption per head of population has increased from 16 to 61 kWh a year.



The company is justly proud of its publicity materials. Above is a selection of sales promotion leaflets *[Elec. Rev. photo.*

At the present rate of development approximately ninety villages are being connected each year and perhaps the method of estimating the probable revenue will be of interest. At one time a personal canvass was made, but it was invariably found that the estimate was too low and also, however careful the canvasser was, there was a feeling of severe disappointment among villagers if a supply was not forthcoming after all. Nowadays one of the company's representatives goes to the village and makes his own estimate without disclosing his identity. The results obtained by this means are surprisingly good and the company receives few complaints from disappointed villagers. All the contracting business is now carried out by the company itself and for the first nine months of the year the turnover in this direction amounted to £171,791—a 32 per cent. increase on the figure for the corresponding period of last year.

Considerable use is made of this demonstration trailer van in outlying districts *[Elec. Rev. photo.*

One of the greatest problems always confronting the company, so Mr. R. B. Brown, the deputy general manager, told us, is to maintain a fair balance between the conditions of supply in urban and rural districts. Obviously the urban consumers would be better off if they could be considered separately, but this is contrary to one of the fundamentals of the company's policy, namely, to treat its area as a single unit. Then there is the question as to whether it is better to supply new consumers or reduce prices. Once again a policy of compromise has been adopted, as large a capital expenditure on development being made as is compatible with a progressive reduction of charges.

Two years ago the drastic decision was taken to sweep away all the tariff boundaries and institute standard charges throughout the area. Actually it was not practicable to do this completely and the Stroud, Thames Valley, Oxford, Lymington and Salisbury portions of the area still retain their own slightly lower tariffs. Over 3,700 square miles of the area are, however, receiving their supplies under the standardised tariff, the principal domestic rates of which are:—Lighting (flat rate), 7d. per kWh; lighting (prepayment), 8d.; two-part tariff, fixed charge of 47s. 6d. per annum for premises up to 700 sq. ft. (6s. per 100 sq. ft. extra up to 1,600 sq. ft., 5s. per 100 sq. ft. above) plus a "unit" charge of a penny; heating and cooking, 1½d.; water heating, ¾d. The last reduction in charges was made a year ago when the lighting flat rate was lowered a penny. A free wiring installation of three lights and one plug point is provided for all consumers in houses with a floor area up to 1,600 sq. ft. who agree to take supplies under the two-part tariff for a year. This is of great help in obtaining new consumers and once connected they rarely go off the two-part tariff. The popularity of this tariff is indicated by the fact that of the 117,252 domestic and commercial consumers connected at the end of September last, 79,586 had availed themselves of its advantages and sales of electricity under this heading increased from 4,612,000 kWh in 1932 to 39,221,000 kWh last year. Free service lines are provided up to 30 ft. underground or 90 ft. overhead.

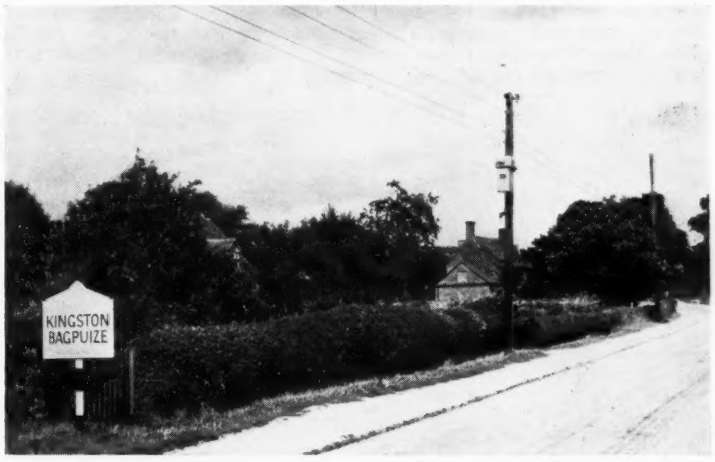
There are at present only about 8,000 prepayment meters, but we understand that it is proposed to extend their use later on by the use of two-part tariff weekly payment meters which have already been used on a limited scale. There are a further 8,000 weekly payment consumers in the Wycombe and Yeovil districts and about 2,900 in the Oxford district. Incidentally these districts, together with the Salisbury and Wilton undertakings, are associated for the purpose of administration with the Wessex Co., to form what is known as the South Western Group of Edmundson's.

The company's farsighted schemes for encouraging the use of electricity for purposes other than lighting are bearing fruit. This year it is anticipated that well over 20,000 appliances will be sold (either outright or on hire-purchase), sales for the first nine months of the year at 16,060 being almost twice as many as in the corresponding period of last year when they numbered 5,582. The actual appliances sold between January and September last year included 3,234 irons, 2,608 fires, 2,924 kettles, 2,764 cookers, 559 water heaters, 586 wash boilers, 75 washing machines, 792 vacuum cleaners, 332 toasters and 315 refrigerators. Particularly good headway is being made with cookers, of which there are now over 10,000 installed, and this year it is confidently expected to sell well over 3,500. The rate of connection of refrigerators too is very satisfactory, especially as it is one of the golden rules for the refrigerator salesmen not to press sales in houses where they cannot properly be afforded, for fear of spoiling the chances of getting water heaters and cookers installed. Although cookers and other appliances are offered for hire in the Oxford area, the general policy is to sell appliances on generous hire-purchase terms and the rapid increase in sales shows the consumers' appreciation of this policy.

The attractive Trowbridge showroom and office building, one of thirty-one owned by the company *[Elec. Rev. photo.*

After purchasing apparatus customers are visited in their homes by demonstrators so as to be sure that they understand properly how to use them. To foster a competitive spirit between the various administrative districts, statistics relating to revenue, sales of appliances and contracting revenue, number of consumers, kW connected, villages connected, etc., are published monthly.

To assist in encouraging the use of domestic appliances demonstrations are given regularly at seventeen of the company's thirty-one showrooms, and a programme of structural alterations now in progress will shortly permit similar facilities at most of the remaining showrooms. New showrooms, each with a demonstration kitchen will also be opened before the end of this year at Pangbourne, Shaftesbury, Headington and Lymington. Dorchester, although the town itself is not supplied by the company, will also soon have a showroom for the use of Wessex Company consumers in the neighbourhood. Close co-operation is maintained with Mothers' Unions and similar bodies and many lectures and demonstrations are given at their meetings.



The mounting of 6-kV lines on the same poles as the low-voltage mains enables many small villages to be supplied economically [*Elec. Rev. photo.*

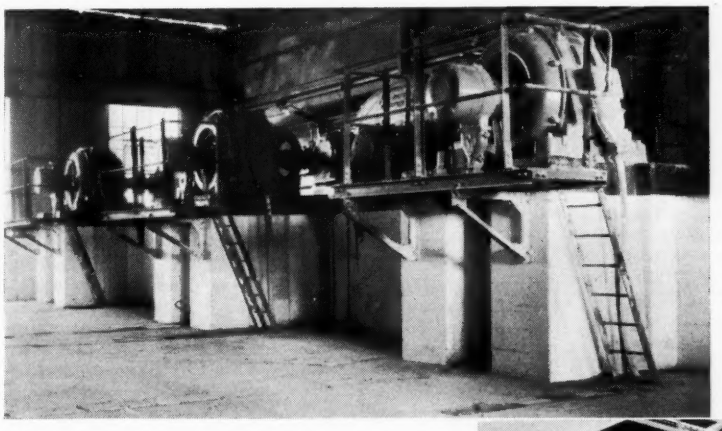
Furthermore, during the past twelve months, no fewer than sixty-nine electrical exhibitions were arranged, either in towns or in newly connected districts, two complete sets of display equipment being available for this purpose. These obtain remarkable public support and the results obtained have exceeded expectations. In addition a demonstration trailer van often proves a popular attraction on village greens, especially at night time, when it is floodlighted and provides music from a loud-speaker for dancing. Carnivals and fêtes furnish another profitable means of introducing electrical propaganda and a decorated van has taken part in about a dozen this year. Floodlighting also plays a big part these days and facilities are provided to hire out apparatus for any special functions.

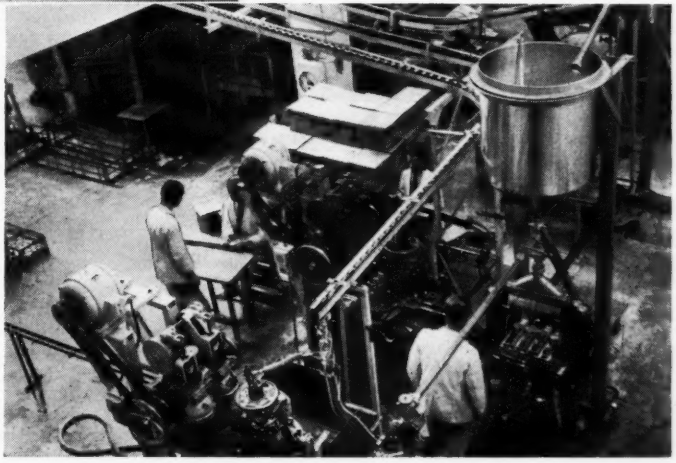
Fifty-five ordinary sales representatives are employed on systematic canvassing of the public for obtaining new connections, selling appliances, etc. Generally these representatives are men from the wiring side so that they are fully competent to give complete estimates for installations, etc. In addition to these there are six specialised refrigeration salesmen and four specialised farming salesmen. Nearly every consumer receives two calls a year and the salesmen work in conjunction with a planned advertising scheme, "pushing" particular apparatus at different periods of the year. The "Better Light—Better Sight" Campaign is followed up closely each season. All members of the company's staff whether on the sales side or not, are encouraged to take the E.D.A. Sales Course, assistance being given in regard to the payment of the fee. Mr. G. E. T. Taylor, the company's commercial manager, is a firm believer in the value of the course in creating a commercial interest, and already 230 of the Wessex staff have taken or are now taking it.

In matters of publicity the company receives considerable assistance from its parent concern, which engages the services of publicity agents to prepare special posters, leaflets, etc., serving all the group, though local requirements and preferences are studied. Results obtained by this method are extraordinarily good and the publicity materials, besides being of very high standard, can be provided at very low cost.

Believing that its employés should practise what they preach, the company offers them every encouragement to make their homes all-electric, and any apparatus required can be obtained on the instalment system at cost price plus the bare interest charges. Considerable advantage is taken of these facilities and Mr. Taylor himself sets a very good example. Employés' welfare is also considered in other ways and not only is there a very generous pension scheme but facilities are provided for various social and sporting activities.

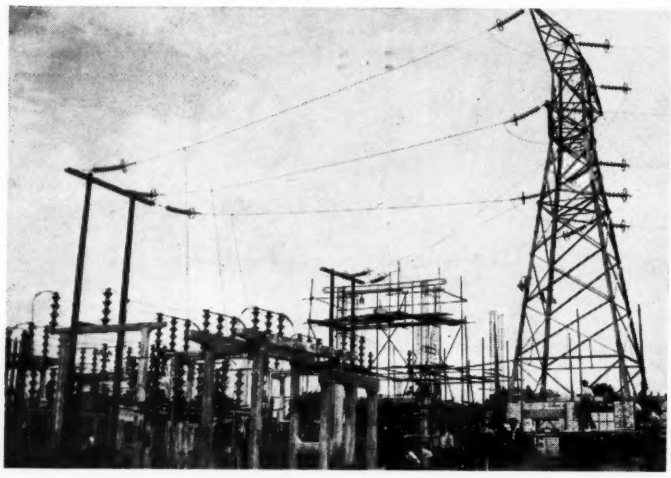
While the majority of consumers are in the domestic class, there are of course several large users dotted about the area. The most important of these include Alpha Cement, Ltd., Shipton-on-Cherwell (annual consumption 20 million kWh); Pressed Steel Co., Ltd., Cowley (11 million kWh); Avon Rubber Co., Ltd., Melksham (9 million kWh); Westinghouse Brake & Signal Co., Ltd., Chippenham (5 million kWh); Morris Motors, Ltd., Cowley (4 million kWh); Leafield Radio Station (1 million kWh); and Pound Taylor & Collen Flour Mills, Melksham (900,000 kWh). Loads such as these are, however, exceptional, and in fact a load of over 200 kW is considered out of the general run, the "bread-and-butter" power loads being generally in the neighbourhood of 50 kW. The attractive terms for off-peak supplies appeal particularly to the small power user since in the majority of cases its adoption results in halving his electricity bill. Under this scheme the only times power is not available are between 4 and 8 p.m. in November and December, between 4.30 and 8 p.m. in January, and between 5 and 8 p.m. in February. For the rest of the year there are no restrictions whatsoever.





Large power consumers include manufacturers of all kinds, particularly those concerned with agricultural products. Above are the three 20-h.p. Metrovick motors driving the slurry mills at the Alpha Cement Works at Shipton, which use 20 million kWh a year, while (right) are seen the cream-canning machines at the C.W.S. Creamery at Cricklade [*Elec. Rev. photo.*

Considerable progress has been made on the agricultural side, and of the 5,800 farms in the area 1,710, with a total load of 4,415 kW, have been connected. The majority of the farms are quite small and many of them are only used as residences, the principal purposes for which electricity is used being milking and cooling, pulping, crushing, chaff-cutting, wood-sawing, water-pumping, clipping, sterilising and the like. Generally speaking, there is very little large power consuming machinery installed or necessary. Unfortunately, most farms are isolated and remote from the distributing mains, necessitating the provision of considerable lengths of high-voltage service lines with local transformers. It is often necessary, therefore, for the company to require a capital contribution.



Alterations being carried out at the Oxford grid sub-station will enable energy to be given at 33 kV instead of 11 kV to serve the northern part of the area
[Elec. Rev. photo.

As previously mentioned, the company employs four special salesmen to develop the farming load and to give advice to prospective consumers. It is also prepared to supply any farming apparatus on hire-purchase terms, and it is always ready to investigate new ways of serving the farming community. Considerable interest was, in fact, created some months ago by experiments undertaken with a new type of hay- and corn-drying apparatus manufactured by Imperial Chemical Industries. During the past twelve months, too, equipment sold has included twenty-eight sterilising devices.

Electric street lighting now covers approximately 150 miles of roads. Considerable extensions are added each year, and it is confidently anticipated that inquiries now in hand, following the M.O.T. Departmental Committee's recommendations, will result in the electric lighting of all Class A roads in towns throughout the area. The company is prepared to provide the necessary capital, which is redeemable over 7, 14 or 21 years, interest being charged at 3 per cent. per annum.

Taken by Mr. Brown and Mr. Taylor for a rapid 350-mile tour we were able to appreciate somewhat the size of the area, the remarkable progress made, and what yet remains to be done. Leaving the picturesque mansion which serves as the central offices at Newbury, we set off in the Salisbury direction, more or less following the course of the 33-kV line which connects the two towns. Just outside Newbury we turned off the main road to see the 33-kV Ball Hill sub-station, which gives 11-kV supplies locally and is now being reconstructed to enable the 11-kV supply to Marlborough to be fed from either Salisbury or Pangbourne 33-kV bulk-supply points. The first of 19 aerodromes situated in the Wessex area came in sight just after we left Andover. The establishment of these aerodromes incidentally has been of great assistance to the company in enabling it to supply villages *en route* which would otherwise not have justified extension of mains at present.

Across Salisbury Plain the 33-kV line has been taken to Amesbury instead of straight to Salisbury in order to have it in a position to supply Army property at Tidworth if and when required. Amesbury, a non-associated undertaking, receives a bulk supply from the Ratfyn sub-station. Nearing Salisbury a section of the transmission lines is being reconstructed at the request of the Air Ministry in order to avoid high ground.

Electrical development at Salisbury has been somewhat handicapped by change-over work. It is, however, expected that the whole Wessex area will have a clean slate in this respect by the end of next year, and the fact that the local electricity showroom, opened a few months ago under the managership of Mr. R. A. McCullock, is without doubt one of the finest shops in the city, should help considerably.

As the network of 33-kV lines has progressed, linking up the important centres of population, the company has closed down the small local generating stations as far as possible, and now purchases about two-thirds of its energy requirements directly or indirectly from the Central Electricity Board, the remainder being generated in small stations at Yeovil, Frome and Salisbury. When we looked in at the Salisbury station a new 935-kVA English Electric alternator was being fitted close to an old water-wheel generator, which has been brought into service in emergencies even up till quite recently.

The Salisbury 33-kV grid sub-station, the largest in the area, was our next port of call. Here two 33-kV feeders are brought in from the grid. Outgoing lines of similar pressure link up with Yeovil, Pangbourne, Frome and Verwood, while to serve Salisbury and Wilton there are three 11-kV lines.

Just after the village of Wilton we passed close to Chalke Valley, where a new supply is to be switched on shortly. Throughout the area the system of ring mains is being extended, with a resulting improvement in reliability.

At the Yeovil offices Mr. W. P. Philpott, the district manager, had some interesting things to tell us of progress in his area. Prospects of increasing business on the domestic side are, in fact, very rosy at the moment, there being about seven hundred new houses being erected. Glove-making is among Yeovil's best-known industries, and about forty manufacturers take supplies of electricity, the largest of them consuming about 27,000 kWh a year. Aplin & Barrett's creamery, with a maximum demand of 141 kW, took 380,000 kWh last year. The new supply to the Cable & Wireless beam station at Dorchester, requiring 400 kW, is to be switched on almost immediately. The local Diesel station operates only four months a year.

Generally, wooden poles are preferred, but at Melksham we passed a small section on steel poles. Frome power station, with its 200 kW of plant, we found in the middle of its annual overhaul. A useful off-peak load of about a million kWh a year is taken in this district for quarry work by Roads Construction, Ltd., and somewhere about 100 kW is required by Tuckers' woollen mills. What may be considered an almost ideal arrangement for rural development work is to be found in the Melksham district (manager: Mr. E. Jordan). It contains nine well-separated towns, Melksham, Chippenham, Corsham, Bradford, Trowbridge, Devizes, Westbury, Malmesbury and Tetbury, each boasting its own showroom, with a rural area in the centre. Much of the district is devoted to dairy farming, and several factories (including Nestlé's) deal with milk products. Incidentally, experiments with Petersen coils are being carried out at Melksham. At Cricklade we had an opportunity to see one of the latest factories erected in connection with the dairy farming industry. This is the C.W.S. creamery, where over a hundred electric motors are used and the annual consumption of electricity is about half a million kWh. Following the usual practice the supply is given at low voltage, the company providing the necessary transformers.

Practically the whole of the Cirencester area is served by two ring mains, under which we passed several times. The raising of the pressure of the Moredon-Highworth line from 11 to 33 kV is a development to be undertaken shortly, and it is also proposed to extend the line from Highworth to Faringdon and Witney, thus completing the 33-kV line between Swindon and Oxford. Considerable interest has been aroused by the company's use of 6-kV lines, mounted on the same poles as the low-voltage mains to enable the supply to be given to small villages on an economic basis. Examples of this are to be found at Kingston Bagpuize and Beedon. Entering Oxford we inspected the alterations being carried out at the sub-station to give the Wessex Co. 33-kV instead of 11-kV supplies from the grid and also to feed 33-kV supplies to the northern part of the area. Not far from Oxford the Shipton Cement Works, which already takes nearly 4,000 kW, is shortly to be equipped with an electric excavator.

Several farms, both dairy and poultry, were visited in the Newbury district, including "Hill House," "Superity," Ilsley Barn, Mayfield and Chesseridge farms, the last four named being operated by the Agricultural Research Council.

Bidding members of the Wessex staff good-bye at Reading, we could not help thinking that it is such organisations as this which should be studied when reorganisation of distribution is under consideration.

Low-voltage Short-circuit Calculations

By R. T. Lythall, Associate I.E.E.

IN earlier articles* I have drawn attention to the urgent necessity for careful estimation of the short-circuit values to be expected on low-voltage systems, noting the difficulties surrounding the design of oil circuit-breakers for use on such systems above certain limiting values of short-circuit expressed as million voltamperes (MVA). Particular notice was then directed to the fact that values of short-circuit, based on transformer capacity and reactance alone, could lead to higher values than could arise in practice and to the specifying of circuit-breakers beyond the limit of practical design at low voltages, such as 400. Stress was laid on the need to take into account the reactive drop due to connecting cables or bare copper conductors, the effect of which is to reduce, in many cases considerably, the value of short-circuit at the low-voltage switchgear.

The effect of equivalent high-voltage reactance

In the present article, in addition to the latter point, particular note is made of the need to take into account also the effect of reactance on the high-voltage side of the transformer which is dependent on the output of the transformer, and the less the capacity the smaller being the effect. As in all calculations for short-circuit values obtained by the percentage reactance method, it is essential that reactance values be expressed in terms of a common base. (See B.S.S. 116-1937, Appendix K).

In many low-voltage calculations the fault MVA on the high-voltage side may not be known precisely. Where an exact value can be determined so much the better, and this value should be used. It is, however, quite satisfactory to use the known breaking-capacity of the switchgear to be installed and reduce this to an equivalent percentage reactance on the common base to be used for the low-voltage calculation, the expression for the conversion being :—Base kVA×100/known MVA×1,000.

Two Examples

As a first example, in determining the possible short-circuit value at the low-voltage bus-bars of the sub-station shown in single-line diagram in fig. 1 (which gives all the essential particulars) the rating of the transformer forms a useful base. The equivalent high-voltage reactance as a percentage on 100 kVA base is then (100×100)/(150×1,000)=0.066 per cent. The transformer reactance is taken as 4.2 per cent. Regarding the cable reactance also as a percentage on 100 kVA base and assuming a reactance of 0.1141 ohm per mile (=0.00097 ohm for 15 yd.) the percentage reactance on kVA base will be 100,000× kVA base×react. ohms/(voltage)²=(100,000×100×0.00097)/(400×400)=0.0606 per cent.

The short-circuit values under three conditions can now be

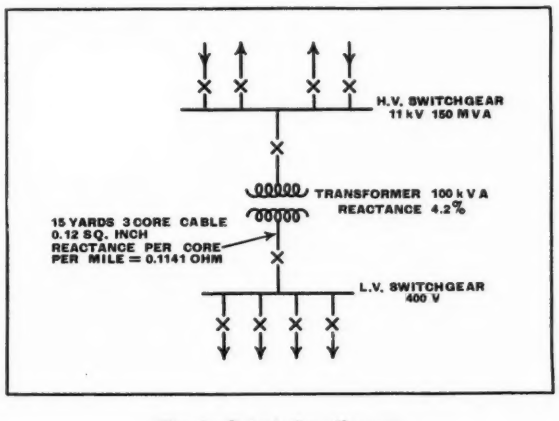


Fig. 1.—Sub-station diagram

derived. Based on transformer-reactance alone, the instantaneous MVA=(100×100)/(4.2×1,000)=2.38. Based on transformer reactance plus equivalent high-voltage reactance it is 100×100/(4.2+0.066)×1,000=2.344. Based on transformer reactance plus high-voltage and cable reactances it becomes 100×100/(4.2+0.066+0.0606)×1,000=2.31. The reduction is, therefore, approximately 1¼ per cent. due to high-voltage reactance and 3 per cent. due to high-voltage and cable reactances. As a second example, consider a case in which the transformer capacity is very much greater, *i.e.*, 2,500 kVA, but the breaking capacity of the h.v. switchgear is still 150 MVA. Then the equivalent high-voltage reactance as a percentage on 2,500 kVA base is 2,500×100/150×1,000=1.66 per cent. The transformer reactance is taken as 5.6 per cent. The low-voltage conductors in this case consist of 15 yd. of four 4 by ¼ in. copper bars for each phase, spaced at 9 in. centres, with a reactance of 0.00424 Ω per 100 ft. (i.e., 0.0019 Ω for 15 yd.). The conductor reactance expressed as a percentage on 2,500-kVA base becomes 100,000×2,500×0.0019/400×400=2.98 per cent. Obtaining short-circuit values for the three conditions: the instantaneous MVA based on transformer-reactance alone is 2,500×100/5.6×1,000=44.6; based on transformer reactance plus equivalent high-voltage reactance it is 2,500×100/(5.6+1.66)×1,000=34.4; based on transformer reactance plus high-voltage and conductor reactance it becomes 2,500×100/(5.6+1.66+2.98)×1,000=24.4. This shows a reduction of some 23 per cent. due to high-voltage reactance, and of some 45 per cent. due to high-voltage and conductor reactances.

The values of the reductions obtained in the second example are worthy of note in that based on transformer reactance alone, circuit-breakers of 50 MVA would be demanded, which as an earlier article pointed out, are impracticable at 400 V. On the other hand, cognisance of other factors allows the use of breakers of 25 MVA, which is reasonable and practical. The importance of this subject may be emphasised by considering two further examples in a slightly different manner. For this purpose assume in one case a transformer of 450 kVA capacity and 4.4 per cent. reactance, and in another case a transformer capacity of 4,500 kVA and 7 per cent. reactance. In each case cable or conductor leads on the low-voltage side will be ignored and, in each case, the breaking capacity of the high-voltage switchgear is 350 MVA.

The equivalent high-voltage reactance referred to the transformer capacity is, in the first case, 450×100/350×1,000=0.128 per cent., and, in the second case, 4,500×100/350×1,000=1.28 per cent. The short-circuit calculations are, with the smaller transformer, on transformer reactance=450×100/4.4×1,000=10.23 MVA and with the addition of high-voltage reactance 450×100/(4.4+0.128)×1,000=9.93 MVA.

With the larger transformer the MVA based on transformer reactance is 4,500×100/7×1,000=64.3, and adding the high-voltage reactance 4,500×100/(7+1.28)×1,000=54.3. The reduction in the first case due to high-voltage reactance is thus about 2.5 per cent., and in the second case 15.5 per cent.

In the foregoing, no account has been taken of resistance, a factor often leading to still further reduction which may be important in the planning of low-voltage networks where the upper limit of breaker possibilities is approached.

Reductions to be Expected

Based on calculations such as the foregoing, the following table illustrates the value of reductions to be expected due to the inclusion of high-voltage reactance in the calculations.

TABLE OF LOW-VOLTAGE SHORT-CIRCUIT VALUES.

Transformer kVA.	Reactance per cent.	MVA on transformer alone.	Added reactance due to high voltage per cent.*	Total reactance per cent.	MVA on transformer plus high voltage.	Reduction due to inclusion of high voltage reactance per cent.
50	4.1	1.22	0.033	4.133	1.21	0.75
100	4.2	2.38	0.066	4.266	2.344	1.25
200	4.2	4.76	0.133	4.333	4.62	3.0
300	4.4	6.83	0.20	4.6	6.54	4.3
400	4.4	9.10	0.266	4.666	8.58	5.6
500	4.7	10.62	0.333	5.033	9.98	6.25
750	4.7	15.9	0.5	5.2	14.4	9.5
1,000	5.0	20.0	0.666	5.666	17.65	10.75
1,500	5.3	28.4	1.0	6.3	23.8	16.0
2,000	5.6	35.8	1.333	6.933	28.8	19.5
3,000	6.0	50.0	2.0	8.0	37.5	25.0
4,000	6.4	62.5	2.666	9.066	44.2	29.5

The advantage gained as transformer capacity increases is illustrated in fig. 2.

The formula used to convert ohmic values of cable or conductor reactance to percentage values is taken from B.S.S. 116-1937, viz., percentage reactance=100,000×kVA base×ohmic value/(voltage)². This expression is derived as follows :—I=full-load current=kVA×1,000/V×1.73, V_x=voltage drop due to re-

* ELECTRICAL REVIEW, April 30th, 1937, and January 14th, 1938.

* The equivalent percentage reactance due to the high-voltage side is calculated on a known MVA of 150.

actance = I × reactance (ohms) = kVA × 1,000 × reactance (ohms)/V × 1.73. Percentage reactance drop = $V_x \times 100/V \div 1.73$ = kVA × 1,000 × react (ohms) × 100/(V × 1.73) (V ÷ 1.73) = kVA × 100,000 × react (ohms)/$(V)^2$, noting that kVA is then that used as a base.

The reactance of cables in ohms can be obtained generally from manufacturing lists or from the manufacturers in special cases. The reactance of bare copper conductors, however, is not so readily available and is complicated by the variations which arise in cross-section, spacing and formation.

Thus the reactance for any given set of bare copper conductors can only be worked out by somewhat laborious arithmetic, based on fundamental formulæ for self and mutual inductance. Nevertheless, the importance of taking this into account, as instanced by the examples above, makes it vital in many cases to resort to laborious work in order to ensure the planning of a system within the limits of circuit-breaker design.

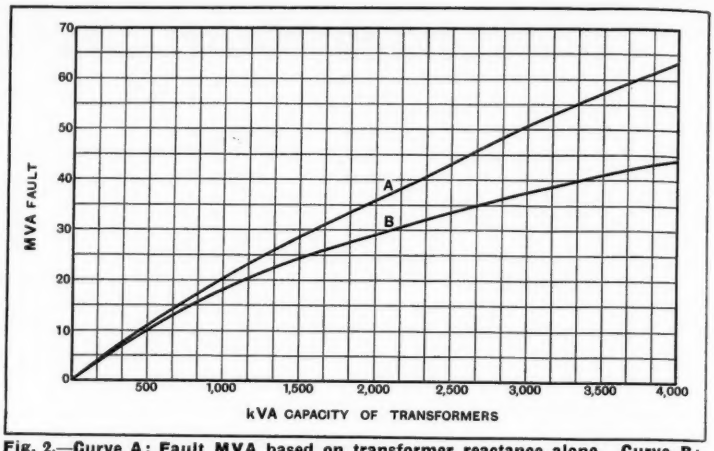


Fig. 2.—Curve A: Fault MVA based on transformer reactance alone. Curve B: Fault MVA based on transformer plus high-voltage reactance equivalent to 150 MVA

Notes from Canada

By Our Toronto Correspondent

The importance of the Dominion as a producer of metals used by the electrical industry is stressed and the mining companies are shown to be among the most important power consumers.

THE mineral industry of Canada, especially that of metalliferous mines, has been expanding rapidly during recent years: the production last year created a record, and reached an aggregate value of approximately £90,000,000. Of this sum metals were responsible for nearly 75 per cent., non-metallic minerals (including fuels) and structural materials—clay products, sand, gravel, etc.—for the remainder.

Of the provinces, Ontario headed the list with an output valued at slightly over half of that of the whole Dominion, the next largest being that of British Columbia, representing about 16 per cent., with Quebec following, at about 14 per cent. Part of the increase in value as compared with other years was due to higher prices and part to increased production. The value of the gold production alone was equal to over 30 per cent. of that of the total production of minerals, Ontario again leading with an output the value of which was 63 per cent. of that of the total gold output.

The interest of these figures to the electrical industry lies in the fact that electric power is utilised to a great extent in the mines of this country. Many mines are served from hydro-electric stations, some of them being at considerable distances from the source of power; others generate their own power, Diesel engines being used in a number of cases, the latter having grown in popularity within recent years.

The Hydro-Electric Power Commission of Ontario alone has, in the mining regions of the province, nearly 900 miles of transmission lines (of which more than two-thirds operates at 110,000 V) serving the mines and surrounding districts of Northern Ontario. The Commission's hydro-electric generating stations in that territory have an aggregate installed capacity of about 340,000 h.p. with an ultimate capacity of 500,000 h.p. The actual load, which is growing rapidly, is about 135,000 h.p.

In the province of Quebec, somewhat similar conditions obtain, though on a smaller scale. It is reported that the Canada Northern Power Corporation, which supplies practically all the mines in Northern Quebec, is planning to develop another 20,000 h.p.; and a mining company in Manitoba has in view the development of power on Duck River near Lake Winnipeg, to give a total of about 6,000 h.p.

One is vividly reminded of the vast area of this Dominion when studying the mines, as practically all of the metalliferous ones lie some hundreds of miles north and north-west of the more settled parts of the country.

Canada's recent mining activities have put her in the front rank as a producer of metals of the platinum group. For more than four years Canada has produced more platinum even than Russia, which formerly held the lead. Practically all of the platinum metals in Canada—platinum, palladium, iridium, osmium, rhodium and ruthenium are obtained from the nickel-copper ores of the Sudbury district in Northern Ontario. The first two metals both have uses in the electrical industries, although the greater part goes to the jewellery and chemical industries.

Canada also now produces more selenium than any other country, the United States being the next largest producer. In this country the metal is obtained from blister copper during the process of refining; it is only seven years since it was first produced here. The use of selenium in the photo-electric cell is familiar to electrical men, but it is also used in the manufacture of glass and pottery, in stainless steel, in rubber, in paint, in dyes and, to a less extent, for many other purposes. It is also coming into use for the vulcanising and fireproofing of rubber insulation on switchboard cables and for increasing the resistance of rubber to abrasion.

Copper Production

While on the subject of mines and metals, some details regarding copper supplied by the Dominion Bureau of Mines and published in a recent issue of *Electrical News and Engineering* will be of interest to electrical engineers. Canada now produces about 15 per cent. of the total world output of copper, and the country is in the fortunate position of turning out a large proportion of this metal as a by-product of the recovery of gold, silver, nickel and zinc. In 1900 the production was about 12,000 tons (2,000 lb.), and rose gradually to about 60,000 tons by 1916; it then fell to 20,000 tons in 1922, but has since risen (with a drop about 1932) until in 1937 it reached 265,500 tons, valued at about £14,000,000. Exports in 1937 were valued at about £11,000,000, the best market being Great Britain, especially the electrical industry.

The United States uses more copper than any other country, the total being (1936) 650,000 tons, the principal internal markets being given as follows:—

Industry.	Tons.
Electrical	164,000
Automobile	108,000
Building	71,000
Electric refrigerators	15,000
Air-conditioning	6,400

It is stated that in normal times the building industry is as large a consumer of copper and its alloys as is the automobile industry.

For the galvanising of steel wire the Steel Company of Canada has recently installed a plant of a type of which there are only four or five others in the world. The machines are designed with an ultimate capacity of 36 wires (present capacity 18) and are over 500 ft. long. The wires first pass through cleaning tanks and go thence to the electrolytic cells, where they pass between flat bars (anodes) of pure cast zinc. The thickness of the zinc deposit is determined by the current-density and the rate of travel of the wire. On the initial installation nearly 3,000 lb. of zinc anodes will be used each day. *Electrical News and Engineering* says it is claimed that the zinc coating is uniform in thickness and smooth, and that it will not crack or flake. A generator giving 22,500 A at from 6 to 8 V is used.

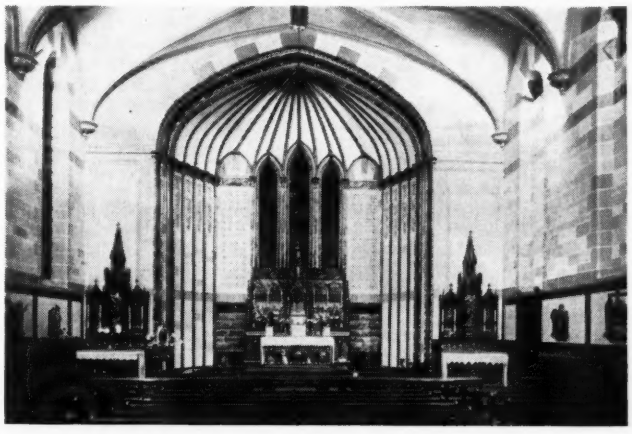
Church Lighting.

By J. B. Harris, Grad.I.E.E.

Probably more than in most buildings careful planning is necessary in the lighting of churches. The author surveys the general requirements and also touches upon exterior floodlighting

THE illumination of many ecclesiastical buildings leaves much to be desired, but finance usually acts as a brake upon ambitious schemes. In some cases the initial expenditure would be high, because the existing lighting is by means of oil lamps or gas fittings, and provision has to be made for complete wiring schemes in addition to the cost of electric fittings. In other instances the installation may be twenty or thirty years old and consequently in a perished state, necessitating new wiring; the fittings, originally converted from gas, are often quite inadequate, and a completely new installation has to be included. A third kind involves the planning of a new lighting scheme only, the wiring being in a reasonably satisfactory state, but often to secure a modern layout some extra points are needed.

It is therefore important to use tact when putting forward the lighting scheme. Members of committees responsible for lighting, heating, and building alterations frequently have their own ideas, and very often architects and consulting engineers are concerned. Criticism on account of a high electrical load may be answered by stating that as the actual hours of use are not very many, running costs will be low.

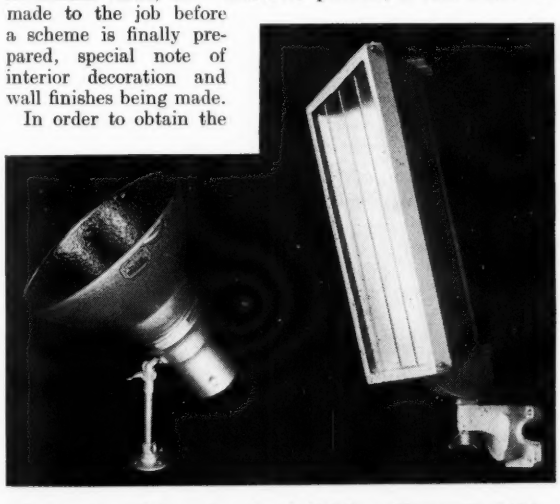


An example of church lighting from concealed sources

Complaints by members of the congregation that they cannot see due to low illumination and presence of undesirable shadows seem to provide the main reason for new lighting schemes. For the nave an average illumination of 3 to 5 ft.-candles is usual practice, and this is sufficient for ease of reading. Due to special problems and requirements, a scheme cannot be planned from a set standard, although in the main catalogue equipment may be used.

The architectural design of church interiors varies considerably according to denomination. Thus an installation planned for, say, a Methodist church will not necessarily be applicable to a Baptist church. Very frequently, due to age, it is not possible to obtain drawings of the church, and this postulates measurements being taken on site, special care being given to elevational views, &c. Wherever possible, a visit should be made to the job before a scheme is finally prepared, special note of interior decoration and wall finishes being made.

In order to obtain the full effect of concealed direct lighting, in which the pews are flooded with light from overhead units, the reflectors and equipment must be concealed from normal points of view, *i.e.*, when looking eastwards towards the chancel. Beams, structural members or clerestory windows usually offer the concealment required, adequate fixing also being obtained. Where there is a chance of glare, the fittings should be used in conjunction with louvred shields or glazing frames. Frequently, it is found that adequate concealment can be obtained only by using high mounting positions, and in such instances concentrating reflectors will prove most satisfactory. In this connection the question of access must be remembered, and the scheme when forwarded should contain some suggestions regarding this.



Two modern fittings for church lighting (Harcourts, Ltd.)

The interior design of many churches necessitates the use of a system of pendants suspended by a long chain from the ceiling or roof trusses. These fittings may be of a general lighting type, such as lamps enclosed in lanterns, or they may take the form of a modern design of candelabra. Due to the relatively greater luminous efficiency of higher wattage lamps, it is preferable to use them rather than a large number of low-wattage sources. If it is desired to concentrate the maximum of light in a downward direction, a reflector may be enclosed in the fitting, which has in addition a lamp for lighting the glass sides, thus dimly illuminating the upper walls and ceiling. The spacing and height of the units naturally depends upon the shape and size of the interior. If wall brackets are also required they may be designed to harmonise with the main pendant fittings. It is not advisable to hang fittings under the apex of an arch, since this tends to "break up" the latter.

An indirect lighting system is often the most suitable for a church interior. In some modern buildings cornices are introduced by the architect for the housing of lighting equipment, a smooth unbroken ceiling of light colour aiding the final effect. The existence of a dome calls for treatment of a similar nature, decorative surface features being given desired prominence. Barrelled ceilings of a broken nature may be treated by means of indirect wall brackets or ceiling-suspended units. A quiet subdued effect is produced by an indirect lighting installation, though the wattage is higher than with direct illumination schemes.

The existence of side aisles and transepts calls for illumination of a similar type to that proposed in the nave. By increasing the average illumination in the chancel, and arranging for a final "build-up" in the altar area, a most effective result is obtained. For the latter position it is nearly always possible to conceal concentrating reflectors focused on the reredos behind structural columns. For emphasis of effect coloured screens are sometimes used.

A local pulpit unit in the form of a desk light should be allowed for. This is mounted on the desk, a revolving shutter controlling the dispersion of light. Frequently the main lighting is dimmed during the sermon and a concealed spotlight illuminates the preacher. Care must be taken here to avoid disturbing glare and distorting shadows. A similar type of desk bracket is required for the organist. In some churches, particularly those of Catholic denominations, tapestries and statues may be satisfactorily treated by local lighting units which help to dramatise the atmosphere. For the lighting of porches, lantern units are usually installed, and these are of a weatherproof nature for outside use. Such interiors as vestries and lobbies call for suitably designed pendant or ceiling fittings of the opal-glass type.

The popularity of floodlighting for revealing the beauties of buildings at night has naturally resulted in its application to church interiors. An appearance of antiquity due to "selective discoloration" of the wall surfaces is emphasised when certain parts of the building only are floodlighted. Coloured lighting is frequently utilised, resulting in very satisfactory appearances. Another method of floodlighting involves the installation of projectors within the church focused on the stained glass windows. The external appearance becomes particularly beautiful under these conditions.

I.E.E. North-Eastern Centre

The annual dinner of the North-Eastern Centre of the I.E.E. will be held on December 7th at the Royal Station Hotel, Newcastle-upon-Tyne.

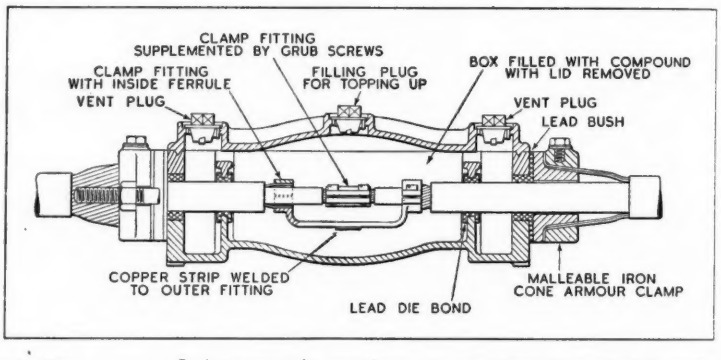
The Dumbreck Colliery Fire

The report of the Electrical Inspector of Mines upon his investigations and recommendations for guarding against similar accidents.

A REPORT on the fire at Dumbreck Colliery, Stirlingshire, on January 30th, in which nine men died of asphyxia, has been issued by the Mines Department (Cmd. 5863, Stationery Office, 1s. 6d.). The fire originated at a junction box where 19/14 cable was connected to 19/18 cable and was intensified by the heavy draught (nearly 12,000 cu. ft. per min.). An incipient defect of a similar kind was discovered in another junction box in the same cable.

The electrical aspects are dealt with by Mr. J. A. B. Horsley, Electrical Inspector of Mines, who states that the earthed concentric system employed has proved effective in guarding against shock due to exposure of live conductors and has also provided for the earthing of metal casings. Its drawbacks are a greater liability to short-circuit owing to its concentric construction and the impossibility in normal working of distinguishing between load current and earth-leakage current, thus preventing the use of leakage indicators or leakage protection to supplement overload protection.

In the present case the inner conductors of the two cables were bound together in the junction box with copper wire; the outer conductors were turned back and laid under the base of a detachable brass cone to the outer surface of which the steel wire armouring of the cable was clamped by a cast-iron draw-gland. The lead sheath was not connected to the box but was laid directly upon and therefore more or less in contact with the outer conductor. The box was not filled with insulating compound. A short-circuit began just inside the box and close to the joint between the inner conductors of the two cables, which was fused asunder, spreading from the negative conductor to the lead sheath, to the brass cone and to the steel armouring wires. It is assumed that a less degree of heating had previously occurred, due to the same cause, in ordinary working, so as to soften the rubber insulation, although at the final failure the cable was not under load but alive.



Mining type straight-joint box for concentric cables up to 0.15 in. (C.M.A.)

There is a widespread belief among colliery electricians that compound sealing is not necessary on technical grounds for joint boxes in which the cable insulation is vulcanised rubber or bitumen. General Regulation 129 (*f*), however, requires that where a cable is joined up to a motor, switchgear or other apparatus, the insulating material at each cable end shall be efficiently sealed. B.S.S. No. 542-1934 also stipulates that sealing boxes, irrespective of the type of cable used, shall be filled with compound and refers to the origin of faults at sealing boxes due to neglect to see that the sealing box is properly filled with insulating compound and that it is compound-tight and water-tight under all conditions.

Detachable Sealing End Boxes

In many mines cable ends are not sealed, especially near the coal face, because of the impermanence of the cables and the difficulty of conveying the molten compound to the spot. A solution of this problem is the use of detachable cable sealing end boxes, two units being used to form a coupling for joining two lengths of cable, and one unit where the cable is attached to a switch or motor. The primary purpose of filling cable boxes with molten insulating compound is to prevent access of moisture to the dielectric. A hard setting compound also supports the conductors, provided that if compound is melted over a fire regard is paid to the critical temperature at which it becomes "cracked" or burned, and that molten compound is not poured into a damp box.

The junction box involved in the fault had no fittings for the attachment of the conductors and did not include any device for making electrical connection to the lead sheath of the cable. A box for a concentric cable has the following essential features (see diagram): A clamp connector for the inner conductor; a clamp connector with an underlying ferrule, or other grip connector for the outer conductor; a clamp, or other connector for the lead sheath; a bonding connector between the outer conductor, the lead sheath and the box; a draw gland or other clamp for the armouring, together with a bonding connection across the box; provision for filling the box with molten insulating compound.

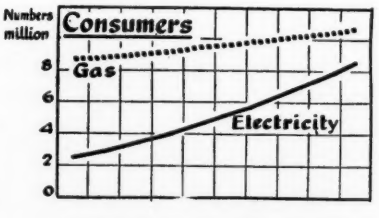
On the occurrence of the short-circuit two circuit-breakers were tripped on "overload," while a fuse in the same circuit, consisting of one strand of No. 18 SWG tinned copper wire, was not blown and was not even discoloured. One switch with an air dashpot was set for 500 A and the other with an oil-filled dashpot for 123 A. The fusing current for the wire was about 100 A if maintained, and its thermal capacity gave it an inverse time current retardation characteristic. The resistance of the circuit from the power station to the point of fusion was approximately 0.698 ohm. This, at 440 V, would result in a short circuit current of 630 A. Nine tests were made by the Met-Vick Co. with currents from 1,880 to 234 A, an oscillograph recording the current and the instant of the interruption of the circuit. At 634 A the fuse was only slightly discoloured; the smaller circuit breaker began to open in 0.25 sec. and completed in 0.312 sec., and the larger began to open in 0.08 sec. and completed in 0.312 sec.

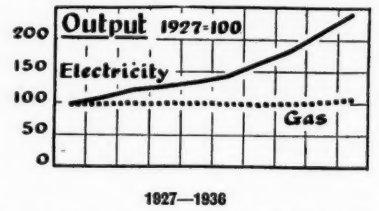
Mr. Horsley's conclusions are that the fire was not directly due to an arc but to the ejection of the molten brass cone into adjacent timber; the short-circuit was due to softening of the rubber insulation of the inner conductor by heat engendered by the passage of current at some previous time between the outer conductor and the brass cone, owing to imperfect electrical connection. While the omission of sealing compound did not contribute directly to the short-circuit, the cable junction box was wholly unsuitable for the type of cable, as it provided inadequate space for accessories; the size of fuse and the settings of the overload trips of the circuit-breakers were not unreasonable.

It is proper, he continues, to use fuses to protect branch circuits or individual motors, if the fuse interrupts the circuit before the automatic cut-out of the feeder operates, but if the sequence is inverted the main cut-out will be replaced without investigation where the only alternative is to seek for the cause of operation while the supply is interrupted. The grading should be in the opposite sense to that commonly employed in the smaller colliery installations, so that an overload in a branch circuit shall not normally interrupt the main supply. It would then be practicable to forbid the reclosing of a main switch without investigation. The reclosing of the circuit-breakers in this instance was not the cause of fire, which was initiated immediately the short circuit occurred.

Gas and Electricity Comparisons

IN a recent issue of *The Economist* there appeared a number of interesting charts relating to the electrical industry, indicating the expansion that took place between 1927 and 1936. The two reproduced compare the increases in consumers and output with those in the gas industry.





1927—1936

Other graphs give the coal consumptions of the gas and electrical industries, the proportion of electricity sold by companies and public authorities, and the total sales for power; light, heat, cooking; and railways, trams and public lighting.

Electrical Christmas Gifts

Implanting the idea and clinching the sale

CHRISTMAS is close at hand and those electrical retailers who have not yet laid their plans must do so straight away. All the year the public gazing in the shop windows has known what it wanted but didn't always possess the money. During the Christmas season the same people find themselves with funds, thanks to various forms of thrift associations, but cannot make up their minds what to buy. It is the business of the electrical trader or supply authority to make sure that a goodly proportion of their expenditure is diverted to the electrical industry.

The first necessity is to hammer in the idea of electrical gifts. Supply authorities are in the fortunate position of having lists of consumers who can be circularised; other retailers will probably find it better to resort to local newspaper advertising. In both cases it is advisable to back up these methods with a really adequate poster display in different parts of the town with appropriate slogans, impressing the electrical Christmas gift idea upon the public mind and giving an indication where these gifts may be obtained. Posters have been too long neglected in this field. It is too easy to forget that the public does not readily think of electrical gifts. E.D.A. offers help with both the advertisements and posters. Any special attraction at the showroom such as an exhibition or competition should also be announced on the posters and in the advertisements.

Advertise your showrooms: the E.D.A. poster *[Elec. Rev. photo.*

Having popularised the idea of electrical gifts, an attractive display is essential to success. Some sort of special effort will have to be made. Those who can afford to be a little lavish in their displays might try an electrical exhibition. During December the streets are not ideal places in which to stand and stare and an open doorway leading to warmth and hospitality is an irresistible attraction during a cold shopping expedition. The door should be kept open and the showroom well heated electrically, but it should be made quite obvious from outside, by means of appropriate wording, that visitors are welcome without being pressed to buy. In addition to a large banner across the top of the building announcing the exhibition, streamers from the window to some central display form an attraction. A special opening at a previously announced time arouses interest and possible publicity in the local press.

A group of small electrical appliances at the Sunco showrooms, all of which are appropriate and attractive Christmas presents *[Elec. Rev. photo.*

In most cases customers' ideas of purchase will not be definitely formed and price will probably be the deciding factor. Therefore the arrangement of stands with appliances classified by price, at least for the smaller items, is a good idea. The up-to-a-pound group is sure to be the most popular and there should be plenty of these in prominent positions. Immersion heaters, irons, toasters, table lamps, soldering irons and kettles will form the bulk of this group. Prominent price range labelling is essential for each group or table, but individual items should retain their tags as there are bound to be apparently similar (but *de luxe*) examples of the same appliances on a higher-priced stand.

In laying out the stands it is easy to fail to allow for the customer's price self-consciousness and the higher-priced stands should be mixed up with the lower-priced ones to avoid a definite "price separation" among customers in the showroom.

The larger appliances, such as fires and cookers, obviously cannot be grouped in this way, but they can frequently be arranged along the walls. Again, prominent price marking is essential. The dubious customer is loath to inquire the price and find it more than he or she wishes to pay.

Whether an official exhibition is held or not, working models always prove an attraction. Electric washers in operation, for instance, are a "draw" and irons and immersion heaters can be tried out. It may be possible to provide a little refreshment with the slogan "Make your own tea by electricity" and give customers an opportunity to use a kettle, toaster or coffee percolator. All appliances, including fires, vacuum cleaners and cookers should be able

Two E.D.A. Christmas window displays with old-fashioned and modern atmospheres

to be connected up immediately for demonstration. The type of window display will necessarily depend to a large extent upon the facilities available within the showroom. If an exhibition is held the window space can be devoted mainly to attracting customers inside, and giving a generally festive atmosphere to the proceedings. The usual Christmas tree and fairy lights make a good show, with a few electrical presents attached to the tree, and judicious use of crêpe paper, cotton wool and cardboard decorations can give a Yule-tide appearance to the whole display.

The lot of the small retailer with only limited space who has to utilise his inadequate window space to the best advantage, is not such a happy one. The necessity of showing as many suitable gifts as possible is apt to lead to severe overcrowding. No-one will look twice at a jumble of goods, and it is better to leave out even apparent necessities than risk spoiling an otherwise attractive display. Once the attention of the passer-by has been attracted half the battle has been won, and there is no reason why a neatly worded notice giving the prices of goods not displayed should not be placed in some prominent position. Incidentally, a list similar to that which we provide on this page could be exhibited in the window—or it could be used as a basis for advertisements. It will also be found useful in checking up stocks. The inclusion of such items as cookers and washers may appear to be going too far, but there are no doubt many husbands who would find Christmas an appropriate time to present their wives with a really useful labour-saving gift, which they might have had to buy in any case. Movement in the window forms an attraction, but flashers should be used with discrimination. Unless they are subdued or partially concealed they defeat their object, making it difficult to concentrate on the objects in the display. Turntables, especially with tinsel decoration arranged to catch the light, are excellent, and there are now on the market several electrically operated moving sales aids.

One word more on window display. Where space is at a premium it is not a bad idea to confine the Christmas decoration to a mural picture at the back of the window. But if difficulties are encountered, E.D.A. has worked out displays, posters and advertisements. The old-time window display which we illustrate costs £5 12s. 6d. and the modern one £4 10s., display plinths costing £1 per set extra. Three small display units depicting a snow scene and an ancient lamp (14s.), an old-time postman (15s. 6d.) and "Santa Claus" with a wheelbarrow containing a coffee percolator (14s. 6d.) are also available.

Most traders will have their own ideas for a display, but hints can very often be gleaned from some of the more outstanding displays of the past. Pantomime scenes form a good subject. Two years ago the Hackney Corporation made good use of a "stage set" of Ali Baba and the Forty Thieves in a mysterious cave discovering all sorts of wonders; pendant lanterns spelt the word "Electricity" and a showcard underneath continued with "Open Sesame to Ease and Comfort"; at the same time a manufacturing company staged the "Sleeping Beauty" with the words "Electricity the 'Sleeping Beauty' of the home, to be awakened as by magic at the touch of a switch so that all may live happily ever afterwards. Domestic electrical appliances are modern fairy stories come true, for they banish to the 'once upon a time' that wicked fairy of dust and drudgery." At the side of the "Sleeping Beauty's" bed lay a group of suitable gifts.

A galleon sailing the seas with the inscription "No ship of old brought such treasure to the home" formed the background to a display at West Ham, which the previous year showed Father Christmas speeding on his way in his sleigh drawn by reindeer, with parcels and packages of electrical appliances stacked up behind him. A prize-winning display at Romford showed a woman in the act of packing up electrical gifts to send away. The showcard read "She's sensible. Knowing the advantages of electricity she is giving electrical gifts." Children round an illuminated and decorated Christmas tree have formed the basis of many successful displays and the jolly face of Santa Claus still has an appeal even in this cynical age.

What Your Money Will Buy

Below is a list of electrical appliances suitable for Christmas presents arranged in order of price. Although more expensive styles of most items are available we have endeavoured to give the average price of a plain utility model.

Up to 10s.

Electric iron
Car radiator heater
Soldering iron
Immersion heater
Door bell set

From 10s. to £1

Kettle
Milk warmer
Porringer
Toaster
Table lamp
Bedlight
Trouser press
Cigarette lighter
Bowl fire
Drink mixer
Shaving mug
Water heater
Bedwarmer
Waffle iron

£1 to £2

Automatic kettle
Automatic iron
Automatic toaster
Coffee percolator
Curling iron
Fan
Hair dryer
Heating pad
Clock
Shaving mirror
Door chime
Portable fire

£2 to £3

Boiling table
Griller
Floor standard
Dry shaver
Coffee set
Fire

£3 to £5

Blanket
Mat
Foot muff
Towel airer
Hand vacuum cleaner
Breakfast cooker
Fire
Convector heater
Ice-cream freezer
Automatic tea set

Over £5

Cooker
Sunlamp
Vacuum cleaner
Refrigerator
Floor polisher
Mixing machine
Washing machine
Washboiler

Where possible folders illustrating Christmas gifts should be posted to prospective customers—a "Northmet" example *[Elec. Rev. photo.*

Quarries and Metal Mines

WHILE there was a reduction in the number of serious personal injuries at the 5,047 quarries employing about 75,000 men in all last year (from 345 to 291) the total number of those otherwise disabled for more than three days increased (from 6,156 to 6,458), as did the number of deaths (from 76 to 84, the worst recorded since the war). Electricity was responsible for only one fatality, however, and no injuries. The single accident was a shock received by an apprentice while altering the wiring of two lamps connected in series between phases at 440 V. During the previous seven years the capacity of motors in use in the 1,319 electrified quarries increased from 97,000 to 170,000 HP (138,000 AC), the increase over 1936 being 18,000 HP. In the 270 metalliferous mines, employing 12,700 men, the total number of fatal accidents was 18 (as against 12 in 1936). There was also an increase in the numbers of those disabled for more than three days (1,195 to 1,291) and of those suffering serious injuries (63 to 65). Of these none was due to electricity. An increase of 1,580 HP of electric motors in the 110 mines using electricity brought the total to 38,230 HP, of which 14,040 HP was underground, where 8,510 HP was employed in pumping. Above ground 8,930 of the 24,190 HP was for driving air compressors. These facts are in "Reports of H.M. Inspectors of Mines and Quarries." (Stationery Office, 1s. net.)

New Showrooms and Offices at Shrewsbury

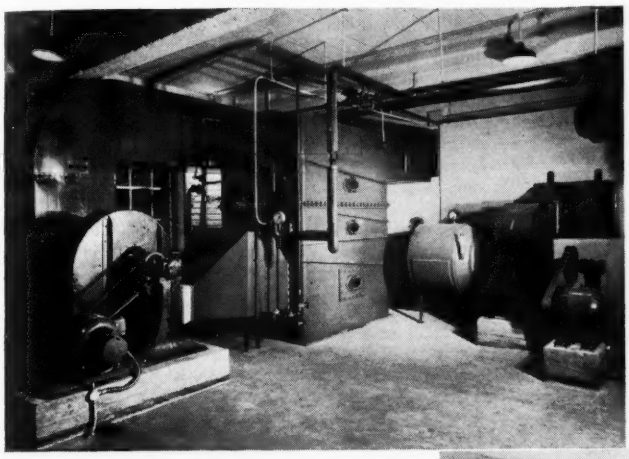
The West Midlands Joint Electricity Authority, which recently took over the Shrewsbury Corporation electricity undertaking, has purchased a block of property in the centre of the town for conversion into showrooms and offices.

Scottish Broadcasting

New headquarters in Glasgow

THE recently completed Broadcasting House, Glasgow, which has been in partial operation since May, is being officially opened to-day (November 18th).

The premises, which the B.B.C. has reconstructed internally and to which two new blocks have been added, was formerly Queen Margaret College for Women and part of the University of Glasgow. The site is in Hamilton Drive, Kelvinside, adjacent to the botanical gardens.



Above: A section of the ventilating plant. Right: The machine room, showing duplicate generating sets

In addition to offices for the programme and engineering staffs, there are ten new studios (in place of the old four in West George Street) and a control room that forms a major link in the simultaneous broadcasting system, providing channels to and from Edinburgh, Manchester, Belfast and a direct circuit to the transmitter at Westerglen.

Associated with the studios is a twelve-panel dramatic control panel. Provision is made by means of bare rooms in the basement, containing only a microphone and loudspeaker, for a portion of the studio output to be fed in and, after being picked up complete with "echo," added to the studio output in the required proportion. Signalling keys operate green cue lights in the studios and return lights permit the studio to indicate that all is ready. A "talk-back" circuit enables the producer in the dramatic control room to speak into a microphone connected to the studio loudspeaker for giving instructions during rehearsals. On transmission the talk-back microphone is connected to headphones only in the studio.

In adjoining listening rooms control of the volume range is carried out and there is a glass window between each studio and its listening room, other equipment including a fading and mixing unit for selecting or combining the outputs of the various microphones in the studio, a loudspeaker and headphones on which the studio programme can be heard and a visual volume indicator in the form of a "programme meter."

Programmes originating in the studios or incoming by line are passed from a distribution desk in the control room to other desks for monitoring and amplitude control. The (controlled) signals are then fed to another switching desk for sending to outgoing lines to the transmitters or other studio centres. Immediately behind the row of desks is a large rack containing high-gain microphone amplifiers, control amplifiers to compensate for the attenuation caused by the mixing and control channels, and incoming and outgoing line compensating amplifiers.

The actual switching is done by punching keys operating 24-V relays. Each studio is tied to a microphone amplifier, the output of which goes to the input-switching relays of the control amplifiers. The gain can be adjusted by potentiometers on the desks in the control room or in the studio listening room, connected in series, or in special cubicles. The position of these potentiometers is indicated by lamps which glow brightly until the control is fully faded up and are then dimmed by a relay circuit which connects a resistance across the lamp.

The special cubicles are used for programmes for which loud-speaker listening is desirable, such as symphony concerts, when control is carried out by a trained musician working with the musical score in front of him. There are many lamp signalling circuits and a telephone switchboard for maintaining contact internally and with other B.B.C. centres.

The control room DC apparatus is energised by duplicate E.C.C. motor-generator sets, each consisting of an induction motor driving three generators delivering 6 V, 24 V and 250 V, maintained constant by an automatic voltage-regulator (J. Stone & Co.) of the carbon-pile type. "Alton" batteries are floated across each generator to maintain continuity of the supply in case of mains failure or other fault.

Ventilation of the studios is effected by Carrier and anemostat air-conditioning plant comprising electrically driven supply and extract fans, an air washer and humidifier, steam heaters and apparatus for the automatic control of the fan motors, air temperature and humidity. The plant is designed to maintain, under normal loading, a constant temperature of 62 deg. F. with a relative humidity of 60 per cent. in studios and other important areas, when the outside temperature is between the limits of 30 deg. F. saturated, 54 deg. F. dry and 48 deg. F. wet.

The power supply for the whole premises is taken from the 6,500 V 50-cycle and low-voltage ring mains of the Corporation of Glasgow through a small sub-station on the site in which the voltage is stepped down to 440 V for power and 250 V for lighting by a 500 kVA transformer. The main distribution and machine room switchboards are respectively of Statter and G.E.C. makes. The cabling and wiring was done by Allan, Arthur & Ure. The lighting fittings are by the Universal Metal & Neon Works, Ltd., special Holophane fittings being used in the studios and entrance hall. The clocks are of the battery operated Synchronome type, while Evans lifts and Eastwood electric water heaters have been installed.

Award Against Supply Company

In the Court of Appeal before Lords Justices Slesser, Mackinnon and Finlay on November 10th Miss Doris Walton, of Fatfield, Durham, appealed from an award of £2,000 made to her by Mr. Justice Hilbery at the Newcastle Assizes against the Newcastle and District Electric Lighting Co., Ltd.

The appellant, aged 24, was standing on the doorstep of a house in Newcastle when there was an explosion near the footpath and she was badly injured, her left leg having to be amputated. The cause of the explosion was a short-circuit in an electric cable under the pavement which caused an escape of gas from an adjacent pipe.

The defendant company admitted liability to compensate the plaintiff. The ground of the appeal was that the amount awarded was inadequate. Mr. Robson, for the appellant, argued that the damages should be at least £3,000.

Without calling upon counsel for the company the Court dismissed the appeal. Lord Justice Slesser, in giving judgment, said that the matter was entirely one for the discretion of the Judge. The other members of the Court concurred.

Meetings and Discussions

In his address as chairman of the Transmission Section of the I.E.E. last week, Mr. S. R. Siviour described some of the methods adopted by the Yorkshire Electric Power Co. in its transmission and distribution systems. On Thursday last week Mr. H. S. Hvistendahl's paper on thermal power plant for peak load and emergency service was discussed at the Institution; the paper was dealt with in our last issue. The principal advantages of thermostatic control for electric cookers were enunciated by Mr. L. J. C. Connell at a recent E.A.W. meeting

Supply in Yorkshire

SERVICE experience, together with constructional features of the transmission and distribution systems with which he is associated, were the subject of the address of Mr. S. R. Siviour (Yorkshire Electric Power Co., Ltd.) as chairman of the Transmission Section of the INSTITUTION OF ELECTRICAL ENGINEERS in London on November 9th.

An outline of the history of the company and its associated distribution concerns indicated the magnitude of the combined undertakings, with three power stations totalling 216,500 kW and a maximum load of 123,185 kW. In 1937 the 123,000 consumers took 415.54 million kWh and 136.25 million kWh was exported to the C.E.B. grid. The number of sub-stations was 1,223, including pole types, while of the 3,411 miles of mains 1,728 miles were overhead.

The Power Co. provided bulk supplies in whole or part to 65 out of the 78 distribution undertakings in the combined areas; also bulk service to its own distribution subsidiaries. The latter had established 600 low-voltage networks in addition to high-voltage transmission and distribution mains in those parts of their areas which were outside the Power Co.'s boundary, within which legislative restrictions had influenced the layout of the transmission system.

That a very large measure of unification and standardisation had been established was evident from the many lantern slides and detail drawings used by Mr. Siviour to illustrate his systems: 66-33-11 kV and 400-230 V. Deep valleys had enabled many long overhead spans to be used, from 700 to 2,368 ft. The Calder Valley span of 1,925 ft. had an earth wire fully insulated so as to constitute a spare conductor under emergency conditions. The crossing of waterways involved the use of very high lattice masts, since clearances up to 120 ft. were sometimes called for.

Standard 11 kV lines on wood poles embodied anti-bird perch brackets which originated in Yorkshire twenty years ago. Steel girder masts of "H" section were no longer riveted. They were fabricated to the Power Co.'s design from special bulb flats welded together at the makers' works, delivered in two sections and bolted with fish plates. They had been used for practically all 33-66 kV lines (about 360 miles) during the past ten years and were particularly suitable for large capacity lines where conditions permitted normal spans of not less than 550-650 ft.

Such masts were easily transportable and presented plain surfaces for painting. They occupied very little more ground than a single wood pole and in consequence were economic in wayleave rentals as well as being much less objectionable to owners and occupiers of land. They were made of home-produced material and the design was sufficiently flexible to damp down vibration and to accommodate itself to any new alignment resulting from a broken conductor without collapse. They could be made in lengths up to 75 ft. Masts of similar construction were used for important 11 kV lines.

Mr. Siviour explained the procedure adopted for making service connections to "live" overhead lines, with the aid of rubber protective sleeves for the wires and hoods for the insulators. Only specially trained men who had been officially authorised were allowed to carry out this work, the condition of the safety equipment being certified monthly by a responsible official.

Pole Decay

Several of the earliest 11-kV lines showed that out of 1,603 poles erected in 1908 and 1909 the replacements due to decay amounted to 96, or say 6 per cent. The first replacements were made in 1932, giving a minimum life of twenty-four years, while the average life of the 96 failures was twenty-eight years. A further 117 decayed poles had been replaced on other parts of the system, most of them with over twenty years' service, making a total of 213 replacements out of approximately 14 000 poles on the system of the age of fifteen years and upwards, or say 1¼ per cent. The Commissioners' scale of depreciation for overhead lines allowed a life of thirty-five years.

In the failures just referred to decay was found mostly between a point about one foot below ground and about 5 ft. above ground, which was the usual experience with partially buried timber. Of the 96 failures in poles thirty years old, 30 were taken from one section of line in waterlogged land which during the winter was generally flooded. Organic impurities were probably present and it seemed clear from this mass failure that these conditions constituted a definite cause of premature decay and should be avoided when fixing the routes of lines. Poles in good clay subsoil generally showed the best condition.

With an aggregate of over 40,000 wood poles and over thirty years of experience the failures under working loads amounted to only four poles. One was a terminal pole, the stay of which broke under exceptionally heavy ice load on the line. The other three were decayed poles which broke under the stress of heavy gales.

Regarding lengths of underground cable liable to extremely heavy short-circuit currents near large concentrations of generating plant, Mr. Siviour suggested that some other class of dielectric more suitable than paper might be desirable. Joints on these terminal lengths also called for special treatment; provision for abnormal expansion and for preventing excessive core movement appeared to be desirable.

In the past ten years joint failures on 542 miles of 11 kV cable were only 2.4 per annum. In twelve years with 118 miles of 33-kV cable containing over 1,100 joints there had been only seven faults—three due to bad workmanship, three to migration of compound and one due to the presence of deleterious matter. Some 28 per cent. of the faults on the underground system was due to external causes. In all new roads in the City of Leeds standard positions were now allocated to the different mains and pipes.

Thermostatic Control of Ovens

THE advantages of thermostatic oven control for domestic electric cookers were outlined to some forty members of the Teachers' Circle of the ELECTRICAL ASSOCIATION FOR WOMEN by Mr. L. J. C. Connell, of the General Electric Co.'s Research Laboratories, at Magnet House, London, last week.

Commencing with some general observations regarding the various applications of thermostatic control, Mr. Connell pointed out that the essential features required of a thermostat for cooker control were robustness, cheapness, long life and the ability to withstand a reasonable amount of ill use. It was possible therefore to put up with a somewhat lower standard of efficiency than was necessary for scientific instruments.

Two heats only were permissible for cooking—high for preheating and low for maintaining the required temperature when it had been reached. With manual control by means of three-heat switching, cooking was always done with a gradually falling temperature, it being the aim of the user to obtain an average temperature somewhere round about the optimum for the particular type of food being cooked. Under this system the only way of obtaining different cooking temperatures was to vary the temperature achieved by preheating. The deficiencies of this arrangement were further emphasised when it was remembered that not only did different types of food require different temperatures, but so also did different quantities and qualities (some had greater water content, for example).

In contrast, thermostatic control possessed the following advantages:—

(1) No switch manipulation was required.

(2) It was no longer necessary to preheat to such an extent, since cooking was done at a steady temperature. An average saving of time of about seven minutes might therefore be achieved.

(3) The control was independent of the amount of food to be cooked.

(4) Reheating between successive batches of cakes, etc., was unnecessary.

(5) It was impossible to overheat and so damage the oven, not to mention wasting current.

(6) Mains voltage variation difficulties were overcome.

(7) The thermostat removed the need for a door thermometer, which on account of its position could never be

a good indicator of oven temperature. (If there were doubt about whether the required temperature had been reached, the thermostat knob could always be turned back.)

(8) It made it possible to cook from a cold oven and, more important still, to introduce time control.

Regarding the merits or otherwise of different types of thermostat, Mr. Connell said that while the liquid expansion type had the advantage of great flexibility of mounting, there was a tendency for the liquid in the bellows located in the switch chamber to become heated, thereby resulting in a gradually decreasing oven temperature. This failing was emphasised when the hotplates, etc., were in use. The bi-metal unit was not much in favour in this country. A model four times actual size was used by the lecturer to demonstrate the operation of the rod-type thermostat, for which, he said, a quick make-and-break switch was most desirable.

The conversion of a cooker to thermostatic control was not simply a matter of putting a thermostat in anywhere and immediately getting perfect results. The position of the thermostat was most important, and so was the time cycle, for if this was too long and if the oven was not properly designed, there would be a tendency to cause excessive radiation during the "On" period.

Peak Load and Emergency Plant

SPECIAL interest was attached to the discussion which followed the reading of Mr. H. S. Hvistendahl's paper (to which reference was made last week) on thermal power plant for peak load and emergency service at the INSTITUTION OF ELECTRICAL ENGINEERS in London on November 10th.

Mr. Johnstone Wright opened the discussion by remarking that, apart from hospitals and radio stations, there was not much need for emergency stations in this country. What the author described as "regular peak load plant" was the type which interested him most. Such plant should occupy small sites and enable capital to be conserved rather than provide high efficiency for the short periods of time during which it would be needed. This plant might have to be installed at load centres where cooling towers would have to be employed, and it was the latter which might limit the size of the station. He was very much impressed by the quick steaming capabilities of the Velox boiler and he hoped that Brown, Boveri would succeed in making this type burn coal.

Peak plant need not be capable of starting at short notice, but if it could do so it would be an additional advantage. He pointed out that some of the present base load stations might in future have to operate on two shifts and all such plant should therefore be designed for daily starting and stopping without wasting time. The author's remarks on the design of turbine rotors were the most important part of the paper as the prevention of distortion when starting and stopping was a subject that needed more research. Present plant prices did not encourage the installation of peak load plant.

The Economic Aspect

Mr. C. L. Blackburn remarked that the use of peak plant was a question of economics and he was sorry the author had not developed this aspect far enough. They might be glad to have peak load plant in this country if it could be obtained at a price materially below that of base load stations. "Limited load factor plant" was perhaps a better term to apply to the class needed in this country. Means to enable regular plant already in operation to furnish extra capacity, say, a 40,000-kW set capable of providing 50,000 kW for two hours, would be a better way of meeting such emergencies as "shut-downs" as distinct from peak load.

Dr. Adolph Meyer supplemented the paper by describing a bomb-proof station which had been installed at Neuchatel, Switzerland, containing a gas turbine as the prime mover. The price was in the ratio of 1-2-3 for a gas turbine, a Velox boiler with a steam turbine and a Diesel generator.

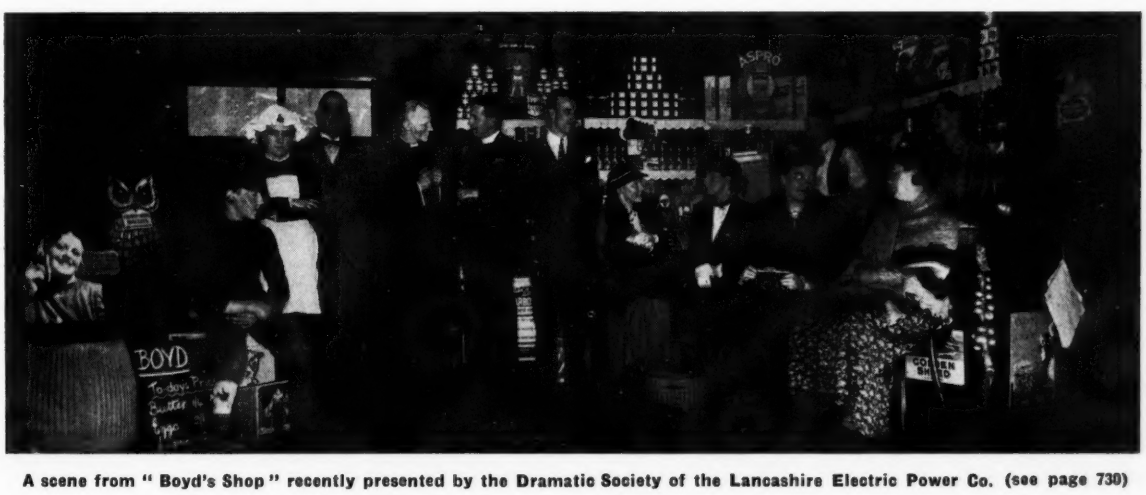
The gas turbine was not of the explosion type, but of the constant combustion design. No boilers, condensers or water were needed so that the plant could be placed wherever it was desired. In tandem on the same shaft were a starting motor, the gas turbine, an axial air blower, the generator and its exciter. The blower compressed air which served the burner in the combustion chamber, but most of it was by-passed round the burner and employed to cool the gases to a temperature which the turbine blading could safely withstand. The simplicity and compactness of this plant was due to the absence of water. It could be installed at the load centre and would solve the peak load problem.

Mr. W. M. Selvey said that the experience of others was instructive, but there was no need to imitate. On the Continent, where large "blocks" of base load were transmitted, standby plant become essential. The extra hazards must be taken into the capital account before hydro-electric development could be commercially evaluated. On the Continent they could not rely for continuous service on base load transmission, but in Britain most stations consumed a large portion of what they produced and exported a much smaller percentage to the transmission system. It was possible to make exact estimates of, and provide for, the absolutely essential amounts of power required by large communities under emergency conditions. It was not a very large proportion, but represented a most important aspect. The Oslo station to which the author had referred represented a perfect solution of the particular problem involved, which was a very important one from the Continental viewpoint. He considered Dr. Meyer's company had made a very good job of that station and the plant therein was now being extended.

Fabricated and Solid Rotors

MR. W. S. BURGE agreed that the case for peak load plant in this country was not very bright. It was sound to keep each set normally separate, but provide cross connections for use in emergencies. If an auxiliary house service unit were required he would be inclined to abandon steam in favour of a Diesel generator. The steam conditions suggested in the paper had been very well selected. A lower vacuum and lower efficiency for peak load plant would enable a price reduction to be made. He considered it important to obtain a low vacuum ratio across the turbine and a low temperature gradient across the boiler house. To put 50,000 kW at 3,000 RPM in one cylinder was rather severe. He had not any experience of fabricated rotors, but they did not appeal to him. British forge masters could make solid cut rotors which designers considered to be absolutely safe. The Velox development was a very valuable one, but he did not like the inclusion of a gas turbine as one of its auxiliaries.

Mr. G. L. Metz was disappointed that the author had not referred to costs. Peak load plant in Sweden had been installed at prices very much lower than those to which they were accustomed in this country. That was possible because the plant was simpler and buildings were cheaper in Sweden. As regarded starting time, the differences between axial and radial flow machines had not been sufficiently stressed. This difference might not be too striking in base load plant, but it was much more so in peak load plant. The author had discussed the time required to reach full speed, but what was more important was the time needed to take up full load.



A scene from "Boyd's Shop" recently presented by the Dramatic Society of the Lancashire Electric Power Co. **(see page 730)**

Mr. G. Lönnegren regretted that the author when discussing quick starting had only given two lines to the radial opposed double rotation type of machine, which was the ideal arrangement for quick starting. He outlined the salient features of that type of machine, pointing out that a high initial vacuum was needed to enable load to be taken quickly and not as the author implied to avoid temperature complications. A 50,000-kW turbine in Sweden had a starting time of four minutes. The author reserved his reply for the I.E.E. *Journal*.

Street-lighting Research

THE work which formed the subject of three papers presented at the November 8th meeting of the ILLUMINATING ENGINEERING SOCIETY in London was part (not hitherto published) of that contributed by the respective authors to an investigation by the experimental panel of the Ministry of Transport Departmental Committee on Street Lighting.

The paper by Mr. F. C. Smith (Gas Light & Coke Co.) describes methods adopted for measuring the reflection factors of clothing, and the manner in which the results were combined for use in the calculation of revealing power. Garments worn in winter have surprisingly low reflection factors, not exceeding 4 per cent. in the case of 65 per cent. of men's coats.

In the paper by Mr. J. M. Waldram (G.E.C. research laboratories) the revealing power of a street-lighting installation is distinguished from the "visibility" as generally understood. The factors which contribute to revealing power are examined and a method of evaluating it is described and compared with others.

A general conclusion is that the dark regions of a road are the sensitive areas, where objects may disappear, where disability glare can have an effect, and where reverse silhouette can occur. It is not useful to seek to increase the background brightness by methods which at the same time so increase the object brightness that the revealing power is unchanged.

Appearance seems to benefit by increased power of the installation after the revealing power has ceased to do so. When power is reduced regions of low brightness are the first to suffer. Revealing power is lower with cut-off distribution, but this does not necessarily imply a serious disability of the cut-off system. The revealing power is reduced as the height of light source is lowered.

The third paper by Mr. C. Dunbar (N.P.L.) describes how a standard curve has been obtained experimentally for relating the brightness of the background to the difference in brightness between an object and the background which it is necessary to have for safe driving at 30 m.p.h.

In practice, background is not usually uniform, but modification of the standard curve is not required on this account provided that the road is dry. If the lighting installation is not free from glare, the standard curve can still be employed if all brightnesses of the background are assumed to be increased by a certain amount. Methods of evaluating this correction for glare have been described.

The results of this work can be applied to the determination of what proportion of practical objects will be revealed to the driver of a car by any region of the background in a street-lighting installation.

I.E.E. Students' Meetings

FACTORY organisation is defined, and its correlation with management, capital and labour discussed, in a paper by Mr. W. E. Butler that was read before the London Students' Section of the INSTITUTION OF ELECTRICAL ENGINEERS on November 15th.

The most concise definition of efficient factory organisation that the author can put forward is the ability to eliminate wasted effort. The manager, who is the common head of personnel and organisation, is the modern counterpart of the legendary figure of the "leader of men." His position as the buffer between capital and labour is one that, though so well known, is not considered deeply enough; but the fact that both the heads of capital and labour are aware of his difficulties has shown itself in the formation of so many welfare schemes, which all big firms are engaged upon to-day.

The ability to keep straightforward jobs running through any factory is no real test of the organisation within that factory, for it does not test the weak points of the system.

The organisation and chief duties of control centres for large distribution systems are described in the paper by Mr. D. H. Ray that was read before the South Midland Students' Section on November 14th. Consideration is also given to suitable localities for centres of this kind, to the equipment necessary, staff required, means of regulating the technical characteristics of the network, alternative sources of supply, protective gear, routine testing, &c.

The author then describes in detail the procedure to be adopted when locating a typical fault, the precautions to be taken when sectionalising and the method of restoring supply. He concludes by outlining the procedure appropriate to the liberation of sections of the network for maintenance, alterations and the connection of new consumers.

Discharge Lighting and Posters

AN attempt to allay the growing antagonism in publicity circles to the use of gaseous-discharge street lamps, on account of their distorting effect on coloured posters, was made in a lecture delivered in London on November 9th to the INCORPORATED SOCIETY OF BRITISH ADVERTISERS by Mr. M. C. Toner (publicity manager of Holophane, Ltd.).

Samples of various lamps were shown to the meeting and their effects demonstrated on different coloured posters, some of which were enhanced by the discharge lighting, a fact which the lecturer emphasised. He showed how the use of a 200-W gas-filled trough floodlight restored the posters to their natural colours again, and pointed out that this was the answer to all queries. Poster firms had no right to expect that street lighting systems should be devised to light their hoardings, contended Mr. Toner, who hoped they would accept this solution and continue with their colours as before, secure in the knowledge that illuminating engineers could preserve their colours by local floodlighting whatever the street lighting conditions were, because white lighting would penetrate any colour lighting and dominate it.

Demonstrations of "black light" on fluorescent wallpapers and artificial flowers followed. Shop window lighting in step with new shop fitting designs, arcade windows and island show cases was then dealt with. Numerous lantern slides assisted the audience to follow the trend of design and illustrated the value of floodlighting.

Hydro-electric Economics

TO what extent is hydro-electric enterprise economically justified? An attempt to answer this question was made at the informal meeting of the INSTITUTION OF ELECTRICAL ENGINEERS in London on November 7th.

Lieut.-Com. R. B. Fairthorne's introductory remarks were illustrated with lantern slides depicting not only types of plant but also some carefully prepared graphs and charts. He said that if water was accessible and reliable, and the civil engineering work of harnessing it, which might amount to 70 per cent. of the capital outlay, was not too costly, and if money could be borrowed cheaply and wayleaves to the industrial load were reasonable, the hydro-electric station would be able to take any off-peak load at extremely low rates. At present 97 per cent. of the generating plant in the United Kingdom was of the fuel consuming type, but the rising costs of labour and of coal might eventually alter the position. In this country the present development of water-power had conserved nearly half a million tons of coal annually.

The Patents Convention

IN his presidential address in London on November 9th to the CHARTERED INSTITUTE OF PATENT AGENTS Mr. W. H. Ballantyne asked whether the International Convention (patents, designs and trade marks) was of any use at all. The basis of that convention was Article 2 of the Union for the Protection of Industrial Property (formed in 1883 and with a permanent office at Berne) which stated that ". . . . persons within the jurisdiction of each of the countries of the Union shall, as regards the protection of industrial property, enjoy in all the other countries of the Union the advantages that their respective laws now, or may hereafter, grant to their nationals . . . no condition as to domicile or establishment in the country where protection is claimed may be required . . . ."

No one, said Mr. Ballantyne, would be rash enough to state that that article had been properly fulfilled. He did not desire to destroy an international agreement existing between forty countries because one country failed to carry out its obligations, but such a failure was good ground for a fundamental overhaul by which this country might regain a certain liberty of action. It might, for example, regain the right to exclude from the benefits implied by Article 2 the nationals of those countries which did not carry out the intention of the Article. The idea of equal treatment for all was simply non-existent.

Some countries did not regulate their practices in accordance with the Convention, while others did not even ratify its texts or pass the legislation necessary to implement the Convention. Great Britain was not the only sinner; in fact advantages and privileges accorded by Great Britain far exceeded those that British inventors had enjoyed, except, perhaps, in the United States.

To carry out the provisions of the Convention as and when expedient was insufficient, and it was useless to tinker with its language. If and when civilised countries determined to enter only into international arrangements which would be genuinely observed, it would be wise to reconsider *de novo* whether it was practicable to have an International Convention which would be accepted completely and textually by all the contracting parties; and would not come into force unless and until the contracting parties implemented it, *i.e.*, took steps to make it a part of their own national laws. Members of the Institute were very familiar with the actual effects of various International Conventions. Before any fundamental overhaul occurred they ought to consider whether in their own experience those Conventions were good and effective. They should consider this from the point of view of their clients and even from their own selfish point of view.

Finally, Mr. Ballantyne suggested that to make any International Convention effective there must be willingness to agree that disputes between countries of the Union with regard to the meaning of the Convention itself should be referred to the International Court of Justice at The Hague, whose decision should be binding on the parties.

Forthcoming Events

Institution of Electrical Engineers.—Thursday, November 24th. Institution, London, W.C.2. 6 p.m. "Electric Heating for Merchant Ships," by Mr. H. C. MacEwan.

Friday, November 25th. Institution, London, W.C.2. Discussion on "Non-Destructive Testing," arranged by the Joint Committee on Materials and their Testing.

Meter and Instrument Section.—Friday, November 18th. Holborn Restaurant, London, W.C.1. 6.45 for 7 p.m. Section dinner.

Informal Meeting. Monday, November 21st. Institution, London, W.C.2. 7 p.m. Discussion on "Distribution and Low-Voltage Short-Circuit Conditions in Densely Loaded Areas," to be opened by Mr. J. W. Leach.

Mersey and North Wales (Liverpool) Centre.—Monday, November 21st. Adelphi Hotel, Liverpool. 7 p.m. Annual dinner.

North Midland Centre.—Tuesday, November 22nd. Hotel Metropole, King Street, Leeds. 7 p.m. "The Surge Protection of Power Transformers," by Messrs. J. L. Miller and J. M. Thomson.

Scottish Centre.—Tuesday, November 22nd. Central Hotel, Gordon Street, Glasgow. 7 p.m. Annual dinner.

South Midland Centre.—Friday, November 25th. Grand Hotel, Birmingham. Annual dinner.

Irish Centre.—Friday, November 25th. Mansion House, Dawson Street. 8 p.m. Faraday lecture on "The Long-Distance Telephone Call," by Capt. B. S. Cohen.

Junior Institution of Engineers.—Friday, November 18th. 39, Victoria Street, S.W.1. 7.30 p.m. "Industrial Electric Heat Treatment," by Mr. C. E. Ward.

Electrical Industries Benevolent Association.—Tuesday, November 22nd. Grosvenor House, Park Lane, London. Annual ball.

Friday, November 25th. Newcastle. Ball.

Illuminating Engineering Society (*Decorative Lighting Section*).—Tuesday, November 22nd. 1, Grosvenor Place, Westminster, S.W.1. Problems evening devoted to "Illuminated Fountains," by Mr. A. Mansell; "Cornices and Brightness" and "Laylights." by Mr. A. W. Beuttell; and "Unframed Glassware," by G. Lovell.

Institution of Engineers-in-Charge.—Wednesday, November 23rd. Magnet House, Kingsway, W.C.2. 7.15 p.m. Joint meeting with the Association of Supervising Electrical Engineers. "Electrical Installation Systems and their Relation to Personal Safety and Fire Risks," by Mr. A. L. Whittenham.

Coal Utilisation Council.—Wednesday and Thursday, November 23rd and 24th. Hotel Great Central, Marylebone Road, N.W. Fourth National Coal Convention.

Electrical Power Engineers' Association (*Southern Division*).—Friday, November 25th. Holborn Restaurant, London, W.C.2. 6.30 for 7 p.m. Annual dinner.

A window display which is being supplied to dealers by the G.E.C. to advertise its 25-, 40- and 60-W "Type B" lamps. There is also a 100-W size

Here and There

By Nomad

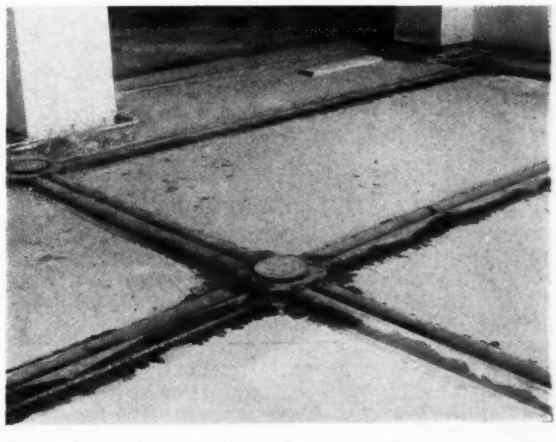
IN Blackburn recently I was very interested to learn how successful has been the scheme of lighting for the open-air Market Place. There are now 320 to 350 tenants, Mr. Ashworth, consumers' engineer, told me, and the total loading is 130 kW. A maximum number of lamps must be used according to the size of the stall, and the tenants must buy their own lamps through the Markets Department to ensure that high-grade lamps are installed. Surface wiring is employed.

* * *

The most outstanding example of surface wiring I have seen is that in the numerous laboratories at the new Birmingham Medical School. There are, I should say, hundreds of plug points distributed on or about the laboratory benches and they are all served by "Stannos" wiring for which the term surface in this case is not, I suggest, an adequate description. Indeed, the wiring is placed as prominently as possible and I think I can detect the guiding hand of Professor Cramp, of Birmingham University, behind this work. The consulting engineers for the works are Messrs. Cramp & Frith. In the adjacent buildings of the New Hospitals Centre there is another wiring scheme I like—sliding doors for the local distribution fuse boards supplied by G. P. Dennis, Ltd. The idea not only saves space when a door is open, but it is also a contribution to safety in that only one phase can be exposed at a time.

* * *

Another building distribution and wiring scheme which I have seen lately is that at the Adelphi New Building, London, where some 40,000 yards of fibre conduit produced by the Key Engineering Co., Ltd., has been laid by Troughton and



Some of the fibre troughing at the Adelphi New Building before being buried

Young, Ltd. The troughs were laid on the floors before the final layer of concrete was applied. This trough system is served by sheet-metal trunking in which are housed vertical aluminium risers which form part of a ring main.

* * *

When I called on Bill Switchgear, Ltd., in its new "home" at Birmingham recently I was more than a little surprised to hear Mr. R. A. Bill talk about two schools of thought in connection with how fuses should be sent out by the manufacturer—complete with fuse elements or without. On the one hand it is said that it can never be known exactly what size of fuse is wanted, but Mr. Bill's recommendation is that while in any case it is better to have the fuse wired the tendency nowadays is to use fuses at the carrying capacities for which they are really designed. Mr. Bill said they have now finally completed the move from the old works and that the turnover for September last was well over three times the average for the old works. At the near-by factory of George Ellison, Ltd., I found work going on for the provision of more accommodation for the sales-estimating engineers, but I believe it is many a long day since the Ellison works was free from the builders.

* * *

Another noteworthy extension to a Birmingham factory of interest to the electrical industry I have seen of late is that at the works at Witton of Higgs Motors, Ltd. This extension covers about 10,000 sq. ft. of floor area and it is being built with heavier steelwork than was employed in the existing buildings, so as to facilitate the lifting of the heavier type of motors which it is proposed to assemble in the new section. Mr. G. B. Richards told me that he had in mind motors weighing above 2 tons or rated at above, say, 150 HP.

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Correspondence

Every letter must be accompanied by the writer's name and address preferably, but not necessarily, for publication. The Editors cannot accept responsibility for correspondents' opinions

The Eastbourne Contractors

I NOTICE in a leaderette in your issue of November 11th a statement to the effect that the Electricity Committee recommended the adoption of part of the proposals submitted by the electrical contractors with regard to showroom sales, but that the Town Council adopted an amendment accepting them in their entirety. This is quite erroneous, since it was the amendment adopted by the Town Council which accepted part of the proposals.

The position is now, in effect, that the 25 per cent. originally given to contractors on all sales is reduced to 10 per cent. except in the case of introductions. Consideration of discounts for hire-purchase transactions has been deferred.

Eastbourne, *November 14th.* J. K. BRYDGES, *Borough Electrical Engineer.*

"Personal" Advertising

I would like to draw attention to the growth of an offensive, and somewhat impertinent, practice which seems to be increasingly adopted by some manufacturers, *viz.*, that of addressing purely advertising matter to the chief engineers or managers of supply authorities, in sealed envelopes endorsed "Personal."

I will refrain from mentioning the firms concerned, in order to avoid giving them cheap publicity, but would say that in several instances these communications emanate from manufacturers and individuals who should know better, and I am quite sure that my brother engineers look upon such correspondence as a nuisance and will entirely ignore the contents.

Ipswich, *November 14th.* HAMPTON E. BLACKISTON, *Chief Engineer and Manager.*

Cheapness or Reliability?

If Mr. Fennell states that electric cookers are too costly, I am surprised, and as an electrical contractor do not agree with him. It is a great pity that we have a supply engineer who holds such a view and particularly expresses it before an I.E.E. meeting.

Perhaps Mr. Fennell is one of those who advocate "load" at any price and if that is so he is most surely "standing in his own light" and assisting to lower the standard of electrical contracting. Electrical apparatus and installations should be built up to a standard and not down to a price, and we should have Mr. Fennell's assistance in bringing about the desired results. ALEX. MILNE.

Glasgow, *November 14th.*

Part-worn Current

To illustrate the ignorance prevailing amongst some consumers, the following story, the truth for which I can absolutely vouch, will perhaps prove of interest. I should explain first that the supply in Bombay City is at 3½ annas per kWh for lighting and 1 anna per kWh for domestic appliances, the latter through a subtraction meter.

A lady friend of my wife had started a small hairdressing-cum-beauty parlour in her flat, but found that the supply bill was very large each month and asked my advice. I found she was operating all the hair-drying, waving, &c., machines from lighting plugs, and suggested that she should have a subtraction meter installed and run the appliances at the 1 anna rate, but this she would not hear of; nothing but "full strength" electricity would do for her machines!

On asking her to explain, I found she fully believed the 1 anna supply was "second hand" and was 3½ anna supply which had been used, returned "along the wires" to the station, reconditioned by some means and sent out again at a cheaper rate!

Bombay, *November 3rd.* R. K.

The Postponed Bill

With reference to your leaderette last week in connection with the distribution proposals, I venture to suggest rather that the general state of affairs is such as to render the subject of vital importance.

One of the major reasons (some would say the only reason) for the proposals is to accelerate development in rural areas upon the basis that even in peace time it is in the national interest. In a state of national emergency how much more essential is it that the most efficient methods, involving a "cheap and abundant" supply of electricity, must be available to the farmer. Thus one would expect the proposals to find a prominent place in the details of the forthcoming defence programme and, being under the heading of "O.H.M.S.," may save a lot of discussion!

One has only to consider the vast schemes announced in America in the name of defence. ALLAN GRANT.

Perth, *November 14th.*

The continued postponement of the promised Bill to deal with electricity distribution must occasion considerable surprise to many of your readers. Probably they may detect some hidden sarcasm in your statement that "although reorganisation may be most desirable it can hardly be said to be vital."

Amongst the "vital" Bills to be discussed during the current Parliamentary session is one to curb the activities of share-pushers. It is probably true that a fool and his money are soon parted, but no amount of legislation will prevent him from finding some other outlet for his get-rich-quick propensities. But despite the urgent call these days for the reorganisation of our national resources, the question of electricity distribution must wait. We cannot be rushed into such trifling matters. After all, it is only about twelve years since the establishment of the grid.

In the name of national efficiency the farmer and farm labourer, deprived of such essentials as adequate water supplies and drainage, must pursue their dismal careers thanking heaven for the faithful oil lamp and our rural railway stations will continue to provide excellent material for music-hall comedians. M. W. SINGER.

Birmingham, *November 14th.*

[It is by no means certain that a Distribution Bill would lead to rapid rural development. Our correspondent should be aware that the supply industry is not entirely neglecting the farmers and good progress is being made in many parts of Great Britain. We may mention as examples Chester, Dumfries, Kirkcudbright, Hereford and Aylesbury and the Wessex area dealt with in this issue.—EDS., ELEC. REV.]

Parliamentary News

(BY OUR SPECIAL REPORTER)

ON November 10th, in reply to Mr. Ede, Mr. Chamberlain, the Prime Minister, said that in view of the heavy programme of domestic legislation already before them this session he regretted that he saw no prospect of time being found for legislation on the subjects dealt with by the McGowan Committee on the reorganisation of the electricity supply industry.

Mr. T. Williams asked if the Prime Minister was aware that the Government, by its attitude, was condemning large areas of agricultural land to having no electricity.

Mr. Chamberlain replied "No, sir."

Electricity at Goole

On November 14th Mr. Dobbie asked the Minister of Transport whether he would have inquiry made into the complaint of the Goole Rural District Council about its inability to secure any electricity supply in the parishes of Fockerby, Reedness, Whitgift, Cusefleet, Adlingfleet, Haldenby, and Eastoft, even in cases where the overhead lines crossed the district and where the premises were within 20 yards of the electricity mains.

Capt. A. Hudson said that the Electricity Commissioners were making inquiries.

Underground Telephone Lines

Mr. Tinker asked the Postmaster-General what percentage of telephone wires were carried underground; and what was the intention of his department in this direction.

Major Tryon said that over 90 per cent. of the total mileage of telephone wire was already in underground cables and it was the policy of the Post Office to provide telephone service by underground wires in preference to overhead wires wherever financial considerations admitted. It was necessary in some cases to use poles and wires for local distribution where the cost of underground plant would be prohibitive.

Television

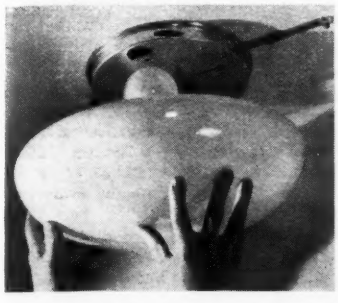
In answer to Mr. R. Duckworth, Major Tryon said that the capital expenditure incurred on the television service up to September 30th, 1938, less depreciation written off, was approximately £126,000, and that the revenue expenditure up to that date, including depreciation and programme, engineering and staff costs, was approximately £660,000. In accordance with the recommendation of the Television Committee, the reception of television was at present regarded as covered by the ordinary wireless receiving licence and no special television licence was required. The question of introducing a special licence was reviewed from time to time by the Television Advisory Committee, but it did not consider that such a course would be desirable at the present stage.

New Electrical Products

A review of equipment recently marketed

An Attractive Ceiling Fitting

A NEW ceiling fitting, produced by TROUGHTON & YOUNG, LTD., 143, Knightsbridge, London, S.W.1, has the merit that practically no metalwork is visible. The metalwork of the ceiling plate, which acts as a reflector, is of untarnishable anodised aluminium, and the wiring is enclosed in substantial holders.



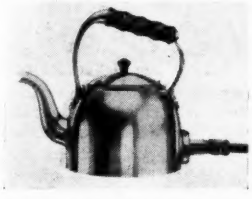
The new "Ultralux-G" fitting

The special locking device is a cranked strip operated by a projecting lever. When the latter is pulled out to its full extent the ends of the strip are brought within the circular plate. The interior flange of the bowl is slipped over a projection diametrically opposite and the lever is then pushed home when the ends of the cranks are forced out and hold the bowl flange in two places. By this means the bowl is held within about a quarter of an inch from the ceiling.

The "Ultralux-G" fitting, as it is known, can be supplied in white or ivory flashed opal glass. The ivory glass is a very pale colour which gives a soft light. Five sizes are obtainable, 8½, 10, 12, 14 and 16 in. in diameter, and both the metalwork and glassware are of British manufacture.

An Immersed-element Kettle

The latest "Creda" kettle of SIMPLEX ELECTRIC CO., LTD., Credenda Works, Oldbury, holds three pints and is of the immersed element type, loaded at 1,500 W. A boiling time of about 2¼ min. per pint is claimed, and the absence of feet enables the kettle to be used on the electric cooker hotplate. The use of its own heating element and the heat from the hotplate results in super-fast boiling.



The new "Creda" kettle

The low setting of the element, close to the bottom of the kettle, allows very small quantities of water to be boiled, and makes the element unit easy to replace. An automatic resettable cut-out guards against damage caused by the kettle boiling dry. An earthed connector and three-core flex are fitted. There is a new design of handle which is specially shaped to fit the hand and, being set at an angle, gives good balance when pouring.

The kettle is available in polished aluminium or copper, and nickel or chromium-plated copper.

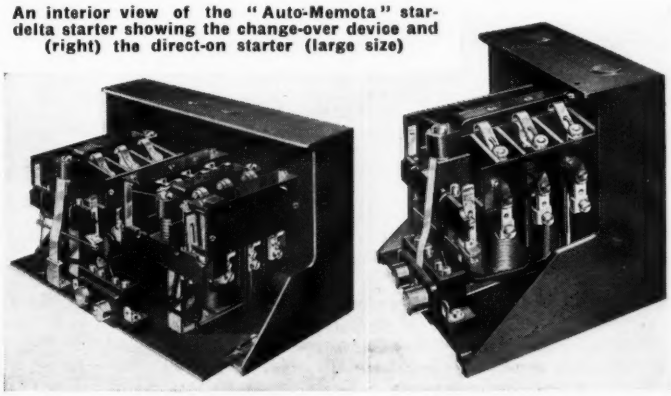
Protective Control Gear for Motors

A redesigned range of motor starters is being made by the MIDLAND ELECTRIC MANUFACTURING CO., LTD., Tyseley, Birmingham, 11. All automatic starters now have a double-break on each pole and visual indication is standard.

The new automatic star-delta starter has automatic change-over from star to delta, and may be employed with advantage where it is necessary to limit the starting current of squirrel-cage and certain other types of induction motors to about two and a half times full load current. The starter consists of two contactors electrically interlocked, the change-over relay operating in about ten seconds, although this is subject to adjustment to suit individual conditions. The relay returns to the start position in about twenty seconds. The primary winding of a coil is energised, closing its accompanying contactor. A voltage is thus induced in the secondary winding, producing a current which heats the thermal element of the change-over relay, causing it to make contact at the make and break points and operate the second contactor. A voltage is then produced in the secondary winding of a second coil which opposes that from the first coil, with the result that the secondary current ceases and the thermal element returns to the start position. This starter is suitable for motors of 3 to 15 HP and taking from 5 to 25 A.

Another new "M.E.M." product is an isolating switch complying with Home Office requirements. It is rated at 10 A. There is also a range of reversers and contactors, and hand reset starters for use in conjunction with thermostat, float or pressure switch remote control. Overall dimensions in most cases have been considerably reduced and the performance of the starters has been improved.

An interior view of the "Auto-Memota" star-delta starter showing the change-over device and (right) the direct-on starter (large size)



Electric Clocks

A new range of domestic electric clocks has just been introduced by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. The majority of these have wooden cases, while some are in chromium plate and others in "Briolite" or crystal glass.

One of the new G.E.C. clocks

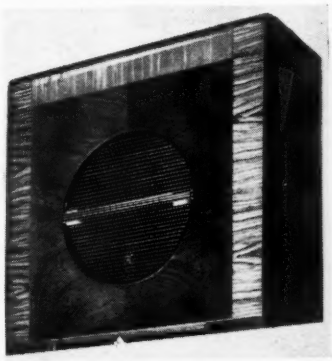
Nearly all models in wooden cases are available in oak, walnut or mahogany with the exception of one model available with a striking or chiming movement and an oak or walnut casing.

The majority of these clocks are of the mantel type, but a number are designed for desk use. Some of the most pleasing in appearance are those of crystal glass with mirrored centre and chromium feet. Other crystal glass mantel clocks are available with blue, green or peach coloured dial. Two models listed are made of "Briolite," an unbreakable glasslike material.

Air-conditioning Equipment

Several improvements have recently been made in the design of the "Zephaire" air-conditioning equipment manufactured by AIR CONDITIONING & ENGINEERING, LTD., 123D, Victoria Street, London, S.W.1.

The unit is housed in a cabinet which is now obtainable in various finishes, including oak, mahogany, walnut, and colours, and comprises a fan, heater and humidifier. The fan, driven by a silent induction motor, impels air through a nichrome element, loaded at 2 kW and running at black heat, and subsequently past a fan-shaped moisture-laden wick which absorbs moisture from a 32-oz. container, evaporation being at the rate of 8 oz. per hr.



The latest "Zephaire" air-conditioning unit

A glass-wool dust filter is employed and the thermostat can be set to maintain the room temperature at any point between 50 deg. and 75 deg. Fahr. A rotary hand-operated directional grille enables the air to be sent in any desired direction.

There is an easily replaceable fusible link at the top of the element which burns out should the fan stall at any time while the heater is in action.

The weight of the unit is 25 lb., and the dimensions 19½ in. high by 19 in. wide by 8¼ in. deep. Special lifting handles are now provided at the sides.

British Overseas Electrical Trade

There was considerably greater activity in both exports and imports of electrical equipment in October than for several months past

IN October the value of Britain's electrical exports rose sharply, the total of £1,875,240 being the highest attained since March and exceeding that for October, 1937, by £157,986 (9 per cent.). The Board of Trade returns for last month also reveal an upward movement in the value of imports, which had remained at a low level since the beginning of the year. While still substantially below the total for the corresponding month of 1937, October imports, at £351,934, were worth more than in any month so far this year.

Table I shows that the high value of exports was brought about by large shipments of electrical machinery, but the position with regard to goods and apparatus was not so unfavourable as the comparisons seem to indicate. Actually, of the seventeen classifications of goods and apparatus twelve show an improvement over the previous month. By reference to

TABLE I.—EXPORTS AND IMPORTS DURING OCTOBER

	Exports. Oct., 1938.	Exports. Inc. or dec. compared with Oct., 1937.	Imports. Oct., 1938.	Imports. Inc. or dec. compared with Oct., 1937.
Submarine telegraph and telephone cables	£3,294	− £14,351	*	—
Telegraph and telephone wires and cables (not submarine)	73,641	− 7,805	*	—
Other insulated wires and cables	302,009	− 31,790	£23,389	− £36,518
Radio receivers, not radiograms (excluding valves)	40,971	− 4,765	9,159	− 4,455
Radio transmitters (excluding valves)	24,987	− 1,630	*	—
Radio valves	57,966	+ 5,494	21,182	− 4,537
Other radio parts and accessories	45,951	− 9,791	75,291	− 12,992
Telegraph and telephone apparatus (other than radio)	213,506	+ 19,621	*	—
Electric carbons	*	—	5,559	+ 274
Incandescent lamps	50,628	+ 345	14,351	− 4,334
Other lighting apparatus	56,535	− 895	46,198	− 16,966
Primary batteries	15,868	+ 483	*	—
Accumulators	67,802	− 3,784	*	—
Electric cooking and heating apparatus	34,924	+ 8,953	*	—
House service meters	12,698	− 4,819	*	—
Other electrical instruments	25,073	+ 4,297	40,228	+ 10,313
Insulating materials not elsewhere specified	19,792	− 430	*	—
Unenumerated electrical goods and apparatus	109,743	− 10,920	64,834	− 11,832
Electric generators up to 200 kW	31,076	− 4,254	*	—
Electric generators over 200 kW	147,136	+ 90,418	*	—
Electric motors	173,195	+ 27,012	24,975†	− 3,709
Convertors and transformers	90,119	+ 29,050	*	—
Starting and controlling gear for motors	38,273	+ 6,986	*	—
Switchgear	192,247	+ 48,566	*	—
Other electrical machinery	17,078	+ 7,933	15,177	− 30,174
Electric vacuum cleaners	30,728	+ 4,012	11,591	− 4,351
Total	£1,875,240	+ £157,986	£351,934	− £119,281

* Not classified separately. † Not railway and tramway motors.

port from the rest of China. The large falling-off in shipments to Rumania is a return to normal after a period of exceptional purchases from this country, and the position of Argentina is similar.

Last month's exports of wires and cables represent a substantial recovery. Although the value was still below that for the corresponding month of 1937, the margin was much reduced. The following is an analysis of the chief destinations of exports of wires and cables other than for telegraphy or telephony, the values in parentheses being for October, 1937:—

Rubber insulated wires and cables.—Australia, £35,537 (£49,142); South Africa, £20,677 (£20,802); British India, £16,824 (£20,314); New Zealand, £11,355 (£10,417); other British countries, £24,072 (£25,320); and foreign countries, £14,523 (£19,988). Total, £122,988 (£145,983).

Electric wires and cables, insulation other than rubber.—British India, £54,284 (£51,321); Australia, £48,045 (£27,225); South Africa, £28,300 (£37,163); other British countries, £28,516 (£39,413); and foreign countries, £19,876 (£32,694). Total, £179,021 (£187,816).

Manufacturers of telegraph and telephone apparatus have had a busy year in their overseas trade; up to the present equipment worth £2,361,861 has been exported, against £1,684,238 in the corresponding ten months of 1937. Last month the total was £213,506, an increase of £19,621, in which foreign markets were principally concerned. The chief destinations were as follows:—Australia, £35,221 (£47,448); South Africa, £25,060 (£29,976); other British countries, £55,720 (£52,565); Argentina, £19,256 (£24,755); and other foreign countries, £78,249 (£39,141).

Electrical machinery exports have for a long while remained at a high level. Last month motors aggregating 1,095 tons were shipped to overseas countries—more than in any month for several years. Foreign countries participated largely in the increased shipments. Australia was the chief buyer of generating plant exported from Great Britain last month, more than half of the total of 859 tons being destined for the Commonwealth. Other types of machinery were exported extensively to British India. It is interesting to observe that the remarkably high value of exports of machinery (not specifically electrical) to Russia continued during October, when the total was £383,219 against only £67,847 a year ago. So far this year machinery exports to Russia have amounted to £2,344,303 against £577,866 in the corresponding period of 1937 and slightly less in 1936.

The total value of electrical imports last month (£351,934) compared with £302,798 in September, but was £119,281 (25

TABLE II.—BRITISH ELECTRICAL EXPORTS DURING OCTOBER

Destination.	Goods and apparatus, Oct., 1938.	Inc. or dec. compared with Oct., 1937.	Electric generators, Oct., 1938.	Inc. or dec. compared with Oct., 1937.	Electric motors, Oct., 1938.	Inc. or dec. compared with Oct., 1937.	Other electrical machinery, Oct., 1938.	Inc. or dec. compared with Oct., 1937.
Eire	£50,352	− £12,568	*	—	*	—	*	—
Channel Islands	20,033	+ 4,058	*	—	*	—	*	—
Palestine	4,465	− 20,148	*	—	*	—	*	—
British West Africa	14,027	− 7,173	*	—	*	—	*	—
Union of South Africa	153,152	− 7,243	£21,958	− £4,982	£28,656	− £1,328	£88,452	+ £14,471
British India	149,338	+ 2,802	14,584	− 5,845	18,235	+ 1,351	108,396	+ 69,744
British Malaya	29,136	+ 4,425	*	—	*	—	12,254	+ 3,419
Ceylon	15,548	+ 1,847	*	—	*	—	*	—
Hong Kong	16,521	− 13,928	*	—	*	—	*	—
Australia	197,406	+ 20,224	103,671	+ 88,195	26,859	+ 8,645	13,195	− 1,218
New Zealand	83,099	+ 3,605	*	—	7,156	− 1,250	21,929	+ 14,258
Canada	13,403	− 1,526	1,268	− 1,003	7,433	− 2,959	7,595	+ 2,373
Other British Countries	51,983	+ 274	17,899	+ 940	23,085	− 1,272	32,000	− 7,040
Sweden	21,107	+ 6,005	*	—	*	—	*	—
Denmark	22,223	− 14,209	*	—	*	—	*	—
Netherlands	34,022	+ 14,978	*	—	*	—	6,992	+ 4,472
Belgium	11,445	− 5,239	*	—	*	—	*	—
France	14,954	+ 2,973	*	—	*	—	2,926	− 261
Portugal	6,869	− 1,405	*	—	*	—	*	—
Spain	3,448	+ 12	*	—	*	—	*	—
Italy	5,388	− 2,135	*	—	*	—	*	—
Greece	2,484	− 6,938	*	—	*	—	*	—
Rumania	7,372	− 26,660	*	—	*	—	*	—
Egypt	8,807	− 5,442	*	—	*	—	1,475	+ 540
China	4,316	+ 3,392	*	—	*	—	771	+ 769
Brazil	4,081	− 3,730	*	—	*	—	*	—
Argentina	37,787	− 22,277	*	—	*	—	2,535	− 33
Other Foreign Countries	172,622	+ 34,289	18,832	+ 8,859	61,771	+ 23,825	39,197	− 9,025
Total	£1,155,388	− £51,737	£178,212	+ £86,164	£173,195	+ £27,012	£337,717	+ £92,535

* Not classified separately. Vacuum cleaners are included in Table I but not in Table II.

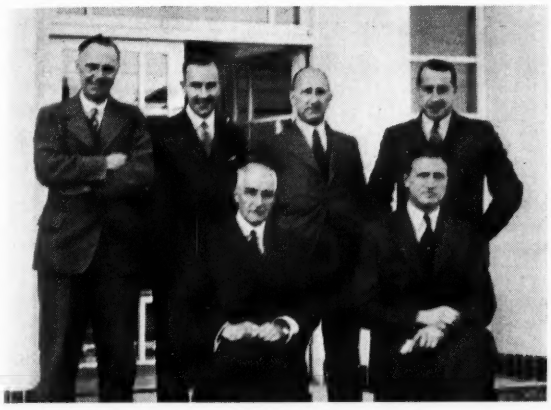
Table II it is also seen that there was no general contraction in markets for electrical goods compared with October, 1937, and the decrease of £51,737 was due to special circumstances. The disturbed conditions in Palestine, for instance, resulted in further restriction of imports of electrical goods from this country, the value being only £4,465 as compared with £24,613 a year ago. Also, the substantial reduction in exports to Hong Kong is probably attributable to the virtual isolation of the

per cent.) less than in October, 1937. The chief supplier of goods and apparatus was the United States, as the following analysis reveals:—United States, £102,346 (£91,657); Germany, £64,554 (£90,745); Netherlands, £45,171 (£64,291); Belgium, £17,198 (£39,924); Switzerland, £14,795 (£17,952); France, £12,846 (£6,088); Austria, £3,883 (£5,181); other foreign countries, £31,284 (£51,129); and British countries, £8,114 (£14,321). Total, £300,191 (£381,238).

Personal and Social

Information regarding new appointments and other matters of interest for this page are welcomed

ON November 8th the annual meeting of the shareholders of Brook Motors, Ltd., was held at the company's works, when presentations were made to two of the apprentices who had gained awards of medals and certificates issued by the Huddersfield Engineers' Training Association. Under the profit-sharing system the sum of £2,340 was distributed to the workpeople, this being at the rate of 16 per cent., bonus, plus the 7½ per cent. earned by the preference shares. Under the twenty-five years' employment scheme, the managing director, **Mr. Ernest Brook,** presented to his brother, **Mr. J. L. Brook,** a writing bureau and a gold cigarette case. Mr. Brook mentioned that at the time Mr. J. L. Brook joined the company it had a turnover of £26,000 per annum, which had grown to more than £300,000. Mr. J. L. Brook, in his response, spoke of his happy connection with Brook Motors, pointing out that they were indeed a united family owing to the influence of the profit-sharing scheme, which enabled everybody to feel that he had something at stake beyond merely earning his salary or wage.



The executive staff of the Newbury Central Office of the Wessex Electricity Co., an account of the load-building activities in whose area appears on pages 711-4
Left to right:—Seated: Messrs. W. E. Brandreth (general manager) and R. B. Brown (deputy general manager). Standing: Messrs. L. H. Parkinson (assistant secretary), J. H. Batchelor (accountant), E. G. Buckman (consumers' accountant), and G. E. Taylor (commercial manager)

Dr. F. B. Jewett, vice-president of the American Telephone & Telegraph Co., and president of the Bell Telephone Laboratories, has been awarded the 1939 John Fritz gold medal for "vision and leadership in science, and for notable achievement in the furtherance of industrial research and development in communication."

Mr. H. Beattie, A.M.C.T., Grad.I.E.E., has been appointed chief meter test engineer to the Sheffield Corporation Electricity Department. Mr. Beattie was previously employed by the Norwich Corporation Electricity Department, and on leaving was presented with an oak bookcase by his colleagues. The city electrical engineer made the presentation.

Mr. G. H. Garbett has been appointed Midland representative for Wm. Sanders & Co. (Wednesbury), Ltd., in succession to **Mr. C. E. Coggins,** who has been transferred to the London area.

Mr. H. Warren, who has recently been appointed to the board of the British Thomson-Houston Co., Ltd., received his early education at Christ Church School, Clifton, and after studying chemistry and physics at the Merchant Venturers' Technical College, Bristol, became a demonstrator in the physics laboratories of the Electrical Engineering Department of Bristol University under Prof. D. Robertson. He joined the B.T.H. Co. in 1911 and worked in the testing department at Rugby. In 1913 he was transferred to the company's Coventry works as heating apparatus engineer, and later he became a meter engineer, afterwards specialising in the new insulation problems of magnetos. In this connection he went to America in 1916, and on his return instituted the production of essential insulations for Air Ministry requirements in a factory near Manchester. Later he set up the moulded insulation plant at Rugby, and was responsible for the development of the synthetic and other compounds that came into general use. In 1921 he was appointed engineer of insulations, and during the ensuing eight years he introduced the manufacture of a variety of new materials and a range of processes. An insulations research laboratory gradually developed in the insulations factory. In 1923 the present Rugby research laboratory was built to accommodate the radio and insulations research work, with the late Mr. R. C. Clinker as chief. When Mr. Clinker resigned in 1929 Mr. Warren succeeded him. Since then to the original radio and insulations sections there have been added electrical and acoustical, lamps and vacuum physics, high frequency, television, chemical and metallurgical, and refrigeration sections. Recently a new building has been erected to accommodate the expanding talking film work of the laboratory, and additional extensions are being carried out to increase the scope of the laboratory's work. Mr. Warren is the chairman of several research and development committees connected with companies constituting Associated Electrical Industries, Ltd., and is chairman of the Apprenticeship Committee, many educational, research and engineering bodies. He is the author of a treatise on electrical insulations, part author with Mr. A. P. Young of a book on electrical ignition, and has written many papers on internal combustion engine equipment, electrical insulations, the production of light, luminescence, and industrial research.

Mr. H. Warren, M.I.E.E.

Mrs. I. McVean, principal of Dicks, Ltd., the Winchester electrical contracting company, has been elected president of the Winchester Chamber of Commerce. Mrs. McVean is the first woman to hold this position and she was one of the first women members of the Electrical Contractors' Association. She was responsible for the wiring of Winchester Cathedral some time ago.

Mr. G. R. Gregory, a member of the firm of Gregory & Son, electrical engineers, of Bailgate, Lincoln, and son of Mr. G. E. Gregory, who was recently married to Miss Kathleen Birkett, of Sutterton, has been presented with an electric clock in walnut case by the firm, and with a coffee service from the Lincoln branch of the Electrical Contractors' Union.

Dr. Herbert Vickers, who was for more than twelve years Professor and Head of the Department of Mechanical and Electrical Engineering at the University of British Columbia, Vancouver, has recently returned to England, and proposes to set up in practice as a consulting engineer. Dr. Vickers was retained for six years as consultant by the British Columbia Railway Co., and before going to Canada had held important positions, industrial and academic, in England. His more immediate interest is the design of AC and DC machinery of all kinds.

Dr. Herbert Vickers

Councillor Mrs. Gregory, the chairman of the National Executive Committee of the Electrical Association for Women, is the first woman to be appointed chairman of the West Ham Electricity Committee, of which she has been a member since 1925. Mrs. Gregory was the first woman chairman of the Education Committee and also of the Public Health Committee at West Ham. The first woman ever to hold such a position was Alderman Mrs. Hammer, later Mayor of Hackney, the first chairman of the E.A.W., and the second was Bailie Mrs. Roberts, senior magistrate of the City of Glasgow for 1937, who has spoken at the E.A.W. Annual Conference.

At a recent meeting the Warrington Corporation decided to defer the question of the appointment of an electrical engineer, but, meanwhile, **Mr. F. V. L. Mathias,** M.I.E.E., is continuing to hold the appointment. When the position was advertised it was stated by the A.M.E.E.-E.P.E.A. Joint Committee that the salary was not in accordance with the "Walker" scale.

Ipswich Corporation Electricity Committee has appointed **Mr. G. H. Blackburn,** assistant consumers' engineer with the Bournemouth and Poole Electricity Supply Co., Ltd., as technical assistant in the installation department at a salary of £383 per annum.

Mr. M. Macken, traffic superintendent with the Manchester Corporation, is to retire after thirty-seven years' service.

Mr. A. S. E. Ackermann, B.Sc.(Eng.), F.C.G.I., M.Cons.E., A.M.I.C.E., has been elected an Honorary Fellow of the Society of Engineers (Inc.).

The first reunion dinner of ex-Ferranti meter engineers engaged in and around London was held at Gatti's Restaurant, Strand, on November 12th, with **Mr. Aitken** in the chair. In proposing the toast "Our Guests," Mr. Mills spoke of the pleasure it gave to see so many old friends gathered together.

Mr. Aitken and Mr. Middleton responded on behalf of Hollinwood and Bush House guests, and mentioned that the gathering included employés of corporations, public boards, supply companies, and rival concerns, and paid tribute to the *esprit de corps* among the Ferranti "old boys" that made such a function possible. An excellent concert followed.

The Lancashire Electric Power Co.'s Dramatic Society presented "Boyd's Shop," by St. John Ervine, at the Queen's Hall, Manchester, on November 9th, 10th and 11th. Acting, production and staging reached a very high order, and after the final curtain **Mr. S. M. Rix,** chairman of the Society besides praising the cast paid a tribute to those who had worked so hard behind the scenes, including Messrs. I. L. Thomas (producer), W. D. Sutcliffe (stage manager), J. Lee assisted by W. Over (lighting), and C. N. Brierley (properties). Mr. Rix also commended the L.E.P. staff orchestra, which was making its first public appearance. A scene from the play is illustrated on page 723.

Mr. W. C. Moore has been appointed chief assistant to Mr. A. Raworth, the chief engineer to the Southern Railway. Previously he was chief assistant to Mr. Raworth when he was electrical engineer for new works.

The Royal Society has awarded the Hughes Medal jointly to **Dr. J. D. Cockcroft,** F.R.S., and **Dr. E. T. S. Walton,** in recognition of their discovery that nuclei could be disintegrated by artificially produced bombarding particles.

Alderman E. C. Ransome, chairman of Ransomes, Sims & Jefferies, Ltd., Ipswich, is to retire from the Ipswich Town Council, owing to indifferent health and increasing years, after over thirty years' service, during which he was for a long time chairman of the Electric Supply and Transport Committee.

Obituary

Mr. W. A. Ward.—We regret to announce the death of Mr. William A. Ward, A.M.I.M.E., assistant managing director of Thos. W. Ward, Ltd., and eldest son of the chairman, Mr. J. Ward, J.P., which occurred at Sheffield on November 11th. Mr. Ward was educated at Leys School, Cambridge, and Sheffield University. He joined Messrs. Thos. W. Ward, Ltd., over thirty years ago, was appointed a local director in 1919, became a full director in 1925, and in March, 1928, was appointed assistant managing director. He was an engineer of wide experience and was specially connected with the machinery and engineering activities of the company. In this connection he made a number of trips to various European countries and the United States.

Mr. C. H. Mackay.—A *Reuter* message from New York reports the death of Mr. Clarence Hungerford Mackay, which occurred on November 12th at the age of sixty-four. Mr. Mackay played an important part in the development of the telegraph and telephone services in the United States. His father joined with James Gordon Bennett in the formation of the Commercial Cable Co., and the subsequent purchase as a "land feeder" of the Postal Telegraph Co. Clarence Mackay entered his father's business at the age of twenty and in 1896 was elected a director of the Postal & Commercial Companies. A year later he became vice-president of both, and president upon the death of his father in 1902. He was chairman of the Postal Telegraph & Cable Corporation, president of the Commercial Cable Co., president and trustee of the associated companies (formerly the Mackay Companies), and a director of the International Telephone & Telegraph Corporation.

Mr. C. L. Terry.—The death is announced of Mr. C. Leslie Terry, managing director of Serck Radiators, Ltd., which occurred on November 12th.

Monsieur E. Rousseau.—The death recently occurred at Charleroi, Belgium, at the age of fifty-eight, of Monsieur Emile Rousseau, president and managing director of the Société des Ateliers de Constructions Electriques de Charleroi, the leading electrical engineering concern in Belgium. M. Rousseau was a pioneer in electric railway signalling and introduced the manufacture of such apparatus in Belgium.

Sir Walter Kent.—The death is announced of Sir Walter Kent, C.B.E., chairman and managing director of George Kent, Ltd., of Luton, which occurred in a Harrow nursing home on November 11th at the age of eighty.

Lady Pearce.—It is with regret that we have to record the death of Lady Pearce, wife of Sir Leonard Pearce, C.B.E., D.Sc., engineer-in-chief of the London Power Co., Ltd., which occurred on November 12th, at Crewkerne, Bickley.

Mrs. M. Stewart.—We regret to announce the death, which occurred on November 13th at her residence, The Hermitage, Lewisham Hill, S.E.13, of Mrs. Madeleine Stewart, wife of Mr. Charles Stewart, B.Sc., M.I.E.E., a director of Johnson & Phillips, Ltd. Mrs. Stewart had been in failing health for some time past.

Will.—Mr. Albert Waterlow Makovski, of Tamplin & Makovski, Ltd., left £55,668, with net personalty £49,748.

Electrical Imports of Peru

Fourfold increase in five years

THE electrical imports of Peru have increased four-fold in value during the past five years. The total recorded last year was 10,722,000 soles compared with 9,730,000 soles in 1936. The United States held its lead with a value of 4,785,000 soles, Germany came next with 1,973,000 soles, and the United Kingdom was a poor third with 618,000 soles. Canada's share has been over 200,000 soles for two years, and that of Japan advanced to 157,000 soles last year. The foregoing totals are exclusive of the group "machinery for industry," which probably includes some heavy electrical plant. The principal countries of origin in the chief groups are shown in the accompanying table, which is based on the recently issued official returns of Peru, increases or decreases compared with 1936 being added. Exchange is 17.38 soles par and 22-23 soles nominal to the £.

This year Peru's favourable balance of trade has decreased as a result of both larger imports and smaller exports. Germany and the United States have been particularly active on the import side, while the value of exports has been adversely affected by the trend of the cotton market. The pressure on foreign exchange has been rather marked, but control has so far been obviated.

	1937. Soles (Thous.).	Inc. or dec. on 1936. Soles (Thous.).
Switches, circuit-breakers and similar accessories—		
Total	497	+ 103
From Germany	198	+ 22
,, United States	229	+ 74
,, United Kingdom	15	− 7
,, Japan	17	+ 4
Accumulators and batteries—		
Total	487	+ 152
From Germany	34	− 7
,, United States	395	+ 160
,, United Kingdom	19	− 4
,, Japan	22	+ 8
Insulators—		
Total	257	+ 175
From United States	152	+ 113
,, United Kingdom	14	+ 3
,, Germany	82	+ 55
Insulated wire and cable—		
Total	1,993	+ 463
From Germany	530	− 235
,, United States	412	+ 67
,, United Kingdom	416	+ 279
,, Canada	50	− 100
Telephone apparatus—		
Total	337	+ 53
From Belgium	226	+ 34
,, United States	37	+ 2
,, United Kingdom	20	− 1
Radio apparatus—		
Total	2,193	+ 477
From Germany	230	+ 150
,, United States	1,593	+ 103
,, United Kingdom	42	− 64
,, Holland	317	+ 272
Radio valves—		
Total	111	+ 36
From United Kingdom	24	− 43

	1937. Soles (Thous.).	Inc. or dec. on 1936. Soles (Thous.).
Cooking and heating apparatus (including industrial)—		
Total	505	+ 162
From Germany	252	+ 45
,, United States	183	+ 93
,, Switzerland	56	+ 31
Unspecified electrical goods—		
Total	234	+ 57
From United States	196	+ 35
Lamps up to 50 W—		
Total	277	+ 69
From Germany	83	+ 34
,, United States	95	+ 22
,, United Kingdom	4	− 3
,, Holland	34	+ 22
,, Japan	40	− 6
Lamps over 50 W—		
Total	224	+ 27
From Germany	53	+ 25
,, United States	101	+ 20
,, United Kingdom	8	—
,, Holland	37	+ 5
Magnetos—		
Total	14	− 3
From United States	11	− 4
Electro-magnetic apparatus (medical)—		
Total	187	− 28
From United States	72	+ 10
,, Germany	101	− 49
Refrigerators—		
Total	475	+ 3
From United States	458	− 9
Fractional HP motors—		
Total	76	+ 32
From United States	46	+ 13

	1937. Soles (Thous.).	Inc. or dec. on 1936. Soles (Thous.).
Dynamos—		
Total	233	+ 116
From Germany	47	+ 8
,, United States	57	+ 40
,, Great Britain	2	− 43
Switchboards—		
Total	1,119	− 356
From Germany	37	− 18
,, United States	48	+ 4
,, United Kingdom	5	− 11
,, Belgium	739	+ 114
Transformers—		
Total	516	+ 110
From United States	120	− 130
,, Switzerland	343	+ 290
Insulating tubes—		
Total	167	+ 65
From United States	142	+ 75
Ammeters, galvanometers, etc.—		
Total	117	+ 4
From United States	89	+ 33
,, United Kingdom	5	− 30
House current meters—		
Total	100	− 53
From Germany	27	− 74
,, Canada	42	− 3
Fans—		
Total	32	+ 10
From United States	24	+ 7
Machinery for industry (other than textile, agricultural, mining, meat-packing and printing)—		
Total	7,472	+ 1,219
From Germany	2,488	+ 475
,, United States	2,997	+ 738
,, United Kingdom	662	− 1,058

Commercial and Industrial News

New Showrooms in London and Manchester. A Fertiliser Factory. Public Health Exhibition. Christmas Air Mails. British Trade with China.

New South-east London Showrooms

THE new showrooms of the South Metropolitan Electric Light and Power Co., Ltd., at 181-185, High Street, Lewisham, S.E.13, are now open. This modern building has taken the place of old offices which have been in existence for many years. The rapid growth in the number of consumers has rendered the old offices completely inadequate and the new building has been designed and erected to meet the ever-expanding volume of business.

The new Lewisham showrooms of the South Metropolitan Electric Light & Power Co., Ltd.

The showrooms, which are on the ground level, have been designed for utility and beauty, the panels of figured Australian walnut and the concealed reflected lighting from the ceiling giving an aspect at once handsome and restful. Here, as also in the fully equipped demonstration kitchen and theatre, are displayed to the best advantage all the most modern forms of lighting, and a wide selection of cookers, radiators, refrigerators, wash boilers and water heaters, together with the innumerable smaller adjuncts to the modern home, office, shop and factory. There are two counters, one for inquiries and the purchase of goods, and the other for the payment of accounts. Leading off the main showroom are private rooms for the interviewing of clients. The new demonstration theatre is equipped with a large stage for displays and demonstrations of appliances, while there is also apparatus for the projection of talking films of technical and general interest.

The whole six-storey building, erected to the design of Mr. J. C. Anderson, the architect, forms a striking feature in Lewisham High Street. The large display windows are illuminated by electric mercury vapour and metal filament lamps and the neon lettering surrounding the facia and the modern "Sunglow" tube lighting underneath the doorway canopy have an effect at once brilliant and artistic. The large neon-illuminated clock outside and all the interior clocks are electrically controlled. In the basement is the heating plant, consisting of a thermostatically controlled electrode boiler, installed under the supervision of Mr. G. W. Martin. There is also an up-to-date electric ventilating system. The first, second and third floors are given to the administrative and clerical staff. The top floor is occupied by the typing and records staff. An electric lift serves all floors. At the rear of the building is a separate entrance for stores.

Importance of Earthing

The need for proper earthing was stressed by Mr. L. H. Marlor, installation engineer to the Manchester Electricity Dept., during a lecture to E.C.A. members on November 9th. Many people, even contractors, did not realise the importance of earthing, he said. Many earthing methods to-day, indeed, were practically identical with those used to neutralise electric charges 100 years ago. Earthing conductors should be of adequate dimensions to carry the fault current, and periodical inspection of them should be made in every factory, office and home. He dealt in some detail with procedure in various works, dry-cleaning plants with ether flowing through pipe-lines, hospital operating theatres, &c. The term "earthing" created confusion in many consumers' minds, for sometimes it was used to define a fault and sometimes as a safeguard against shock. He stressed the importance of using three-core flex. During the useful discussions the branch chairman, Mr. S. Dickinson, remarked that they could do with a code—a proper set of rules—to be adhered to when they undertook work. This would be in the interest of not only the contractor in ensuring sound work, but would add to the consumers' safety. Another point he raised was the desirability of something like a clearing house, where every make of speciality could be tested, and issued with a label of reliability. Mr. Marlor replied that such tests had often been made by his department, but it was found that a lot of work was being done by the Corporation which ought to devolve on manufacturers.

Three examples of the Christmas folders which are now available

Talking Fires

In our last issue we made brief reference to the "talking fires" seen on the stand of Berry's Electric, Ltd., at Olympia. One of these is a "Magicoal" basket fire set in a fireplace in which a speech reproducer is fitted. By means of this it is possible to obtain radio or gramophone programmes while seated by the domestic hearth, but the idea has been developed for sales purposes. Mr. H. H. Berry has had a record made of a brief discourse in which he describes the evolution of the "Magicoal" and extols electric heating in general. A similar device is employed in connection with the colour-changing "Chameleon" equipment with great effect. Mr. Berry tells us that over a hundred electricity supply undertakings have taken up this idea for use in their showrooms.

Polytechnic Prize Distribution

At the annual prize distribution of the School of Engineering which was held on November 4th in the Fyvie Hall at the Polytechnic, Regent Street, London, W., the awards were distributed by Lord Ashfield, chairman of the London Passenger Transport Board. Mr. Kemp, the head of the school, announced that there were over 2,300 students studying various branches of engineering at the Polytechnic. Lord Ashfield remarked on the value of a business training, in addition to technical knowledge. For a man to rise to the top he must have personality as well. The capacity for passing examinations was not, in itself, sufficient.

Christmas Publicity

Folders suitably decorated in festive manner and illustrating electrical Christmas gifts have been issued by the North Metropolitan Electric Power Supply Co., the General Electric Co., Ltd., Bulpitt & Sons, Ltd., and the Sloan Electrical Co., Ltd. Special wrappers in green or red and silver are being used for H.M.V. irons.

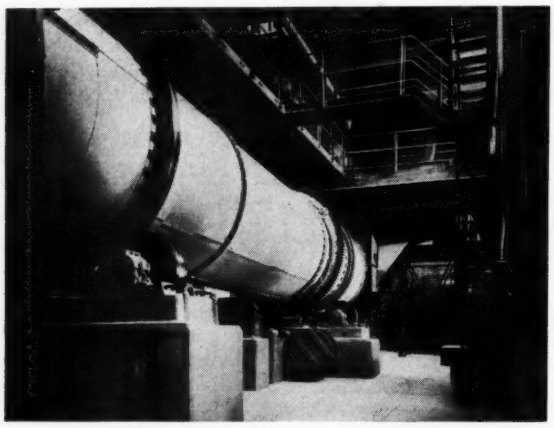
Canadian Specification for Electric Wire

With regard to Canadian Standard Specifications in respect of certain electrical material, &c., the *Board of Trade Journal* announces that the Department of Overseas Trade has received a copy of Specification No. 49 covering the construction and test of flexible cord and fixture wire, which is available on loan to United Kingdom firms (reference No. 24415/38).

Copies of a memorandum on the approval of electrical goods for sale in Canada are also available for distribution at the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1.

A New Fertiliser Factory

Some 350 HP of electric motors is installed in the new granular compound fertiliser factory at Ipswich of Fison, Packard & Prentice, Ltd., which has a production capacity of 75,000 tons per annum. Callender cables were installed throughout both for power and lighting, the power cables



A 65-ton rotary dryer driven by a 50-HP motor in an Ipswich fertiliser factory

being three-core 660-V C.M.A. grade v.i.r. lead sheathed (approximately one mile) and the lighting cables 250-V C.M.A. grade v.i.r. in conduit (approximately ten miles). The whole of the electrical work was carried out by Messrs. Fison's electrical department. The largest of the twenty-eight motors is of 65 HP and drives a dust collector and gas fan; one of 50 HP drives a 65-ton rotary dryer through reduction gear; two 20-HP motors drive mixers, and another a 30-in. belt conveyor between the mixers and the rotary dryer. Nine belt conveyors, with a total length of 1,800 ft., are driven by motors of 8, 4 and 2½ HP, all being sequence interlocked with 3/0.036 cable. Kalbitum paint was used exclusively for the factory, black for all structural steelwork and light grey for plant, a total of 250 gal. The enforced collection of sulphur fumes from smelting works has resulted in the production of a large amount of sulphuric acid. The Imperial Smelting Corporation, Avonmouth, invited the co-operation of Fison, Prentice & Packard in a joint scheme for turning their surplus acid into superphosphate, and the resulting company, National Fertilisers, Ltd., erected works at Avonmouth with an annual production of 80,000 tons of superphosphate. Fison's have decided to erect a synthetic nitrogen plant at Scunthorpe, from which they expect an output of 60,000 tons of sulphate of ammonia per year.

The Batti-Wallahs

As we mentioned in our last issue, the next luncheon of the Batti-Wallahs' Society is to be held on December 14th. The guest of honour on this occasion will be Mr. H. J. Wellingham, M.C., who will give an address on "The Cable and Wireless Systems of the World," illustrated by charts and lantern slides. Tickets (6s. each) can be obtained from the hon. secretary, Mr. M. Whitgift, 5, Parkside, Cheam, Surrey.

London Store Window Lighting

The recently installed lighting system in the new windows of C. & A. Modes, Ltd., at 380, Oxford Street, London, W.1, to which we briefly referred in an earlier issue, marks an important step in the technique of display window lighting. Daylight illumination was made possible by the introduction of Philips "Philora" 80 and 125 W "MB" mercury lamps, the light from these lamps being blended with that of Philips incandescent lamps. The proper combinations of the two types of lamp and the method of blending

A "balanced-light" system is used in lighting this London store window

are important, and for this purpose a new system, the "Realite" balanced-light principle, has been developed by Rowlands Electrical Accessories, Ltd. For this installation 126 "Realite Super-Mix" units were used, each accommodating one 125-W mercury lamp, with two 150-W and two 200-W tungsten filament lamps. The units incorporate a special system of mounting and light filtration. The result is a very high degree of colour appreciation throughout the whole colour range. The windows of C. & A. Modes, Ltd., one section of which is shown in the accompanying illustration, consist of a main island window, with two large windows on each side of the shop frontage. A special method of soffit mounting was adopted, and the installation was designed for an allowance of 425 lumens per square foot. The scheme was planned by Rowlands Electrical Accessories, Ltd., in conjunction with C. & A. Modes, Ltd. The electrical contractors were the Crabb Electric Co.

An Exhibition of High-frequency Materials

The remarkable versatility of the low-loss ceramic dielectric material "Calit" and the accuracy with which even the most complicated components can be made from it are the outstanding feature of an exhibition which is being held this week at the Hotel Great Central, London, by the United Insulator Co., Ltd. Among its many useful properties is the ability to have silver (and subsequently copper) deposited on it and also to be fused to glass. It has a remarkably high tensile strength and is actually flexible. This last property has been utilised in a new range of stable air-spaced ceramic coils with metallised windings, which are of uniform and accurate pitch and can be opened or closed by a screw mechanism to give a wide degree of variation. Other exhibits include fixed and variable condensers of all kinds, insulators, coil formers, temperature coefficient regulating devices, bushings, switches, glass and ceramic cathode ray tubes, and a radio transmitter valve with a "Calit" bridge. The new "Peton" plastic material, which is half the weight of aluminium and is claimed to wear better than phosphor-bronze, is shown made into nuts, bolts, gear wheels and machined parts.

"The Trader" Year Book

The 1939 edition of "The Trader" Year Book, which has just been published, provides a useful and up-to-date business aid for dealers and others concerned with radio and domestic electrical products. Every part of the book has been revised and fresh features have been added to meet new trends and requirements. The contents include an alphabetical directory giving the names, addresses and telephone numbers of manufacturers and agents in the radio and domestic electrical trades; a radio and electrical wholesalers' directory; a "where to buy" section; and a directory of proprietary and trade names. There are also technical specifications of 663 receivers and radio-gramophones which are listed as current for the 1938-39 season by forty-six manufacturers, with valves specified, wave-ranges, intermediate frequency, impedance of extra loud speaker, price and release date. The mains voltage directory covers towns and districts in Great Britain, with a separate list covering selected Empire and foreign towns. Tables and diagrams are given showing base connections of all British and American valves, and there are tables giving complete characteristics and prices of 900 different valves in general use. Condensed specifications of the sixty-eight different televisors and units which have so far been announced by the manufacturers are included. Other features are explanations of the various licences which the dealer should know about, and articles on the Hire Purchase Act and the new Factories Act. There is also, of course, the usual diary. The price of the book is 7s. 6d. post free (issued to *Wireless and Electrical Trader* subscribers at a reduced rate), and it is published by the Trader Publishing Co., Ltd., Dorset House, Stamford Street, London, S.E.1.

The Public Health Exhibition

Air Raid Precautions are practically monopolising attention at the Public Health Services Congress and Exhibition now being held at the Royal Agricultural Hall, Islington. Electrically, perhaps the most interesting exhibits are the two shown respectively by the Automatic Telephone & Electric Co. and Standard Telephones & Cables to demonstrates their systems for the remote control of street lighting and air raid alarms. More peaceful applications of these systems include the control of water-heating apparatus, shop window lighting, advertising signs, two-tariff meters and miscellaneous off-peak loads.

A wide range of batteries, emergency lighting equipments, portable lamps, &c., intended specially for A.R.P. work is in-

cluded in the displays of Batteries, Ltd., and the Chloride Electrical Storage Co., while mobile public address equipment and ultra-high-frequency wireless telephone apparatus are special features of the displays arranged by Film Industries, Ltd., and Ardente Acoustic Laboratories, Ltd., civilian gas masks fitted with telephones being shown by Siebe, Gorman & Co. On Pinchin, Johnson & Co.'s stand attention is drawn to the gas-resisting properties of "Vigorised" paints for air-raid shelters, &c.

Among hospital and special health exhibits particular prominence is given to dental equipment. One of the most comprehensive displays of dental X-ray apparatus is to be found on the stand of Philips Metalix (Philips Lamps, Ltd.), who also show their new "Metalix 350" ultra-short-wave therapy apparatus and the "Biosol" ultra-violet-ray unit. A section of a model public health clinic and a scale model of a collective light treatment room are displayed by Hanovia, who are also demonstrating the new "Uster" steriliser for the purification of water by applying the bactericidal qualities of ultra-violet radiation. S. Maw & Sons' latest "Sterotherm" electric hot-air steriliser derives increased efficiency from its reflecting aluminium lining.

A thermostatically controlled pastry oven with an illuminated thermometer, a steaming oven with a special ball-valve control to the heating chamber, and a portable "Backer-Jackson" radiant boiling plate table unit are new products to be seen among the comprehensive display of large electric cooking equipment, heated food trolleys, &c., arranged by the Jackson Electric Stove Co. Electrical equipment on the Carron Company's stand is represented by a large cooking range and a grill.

Demonstrations of an electric bread-slicing machine and a toaster which automatically switches off the electricity, rings a bell and shows a red light when the toast is ready, are given by the "Euk" Manufacturing Co., while the Avamore Engineering Co. includes among its exhibits the latest "Wickstead" bread buttering and slicing machine, an electrically heated food trolley and the "Cornhill" potato peeler. Both potato peeling and mashing machines are made by Mabbott & Co., Ltd. A dish-washing machine, a new streamlined domestic washing machine and a "Disposall" sink unit are the principal Hotpoint exhibits. In addition to the new "Ekco-Coffield" washing machines, E. K. Cole have a selection of "Thermovent" convectors. A new mains driven hedge-shearer is demonstrated by Lloyds & Co. (Letchworth).

Christmas Decoration Lamps

To compete with cheap foreign and frequently inferior decoration lamps the British Thomson-Houston Co., Ltd., Edison-Swan Electric Co., Ltd., and General Electric Co., Ltd., have introduced this year a set of twelve lamps at only 5s. They are suitable for any indoor festoon lighting, being a simple outfit without shades comprising flexible cord, lampholder adaptor and coloured lamps. These new Christmas decoration lamp sets are suitable for all voltages from 200 to 250 V.

New decorative lamp sets by prominent manufacturers

New Hotpoint Manchester Showrooms

On November 4th the new showrooms of the Hotpoint Electric Appliance Co., Ltd., at Hotpoint House, Corporation Street, Manchester, were opened by Mr. H. A. Lingard (chairman of the company), supported by Mr. T. Mensforth (managing director) and Mr. W. E. Rawlinson (general manager, Northern Area). An invitation had been issued to the members of the E.D.A. North-West England and North Wales Area Committee, to be in attendance as guests of the evening, and the majority of the chief engineers forming this committee were present. Mr. Lingard mentioned the rapid growth of the company during the last few years, and particularly referred to the work which was being done by it in connection with kitchen planning. Mr. F. V. L. Mathias (chief electrical engineer, Warrington, and chairman of the E.D.A. Area Committee) replied on behalf of the visitors. The showrooms are divided into four sections. The main part of the showrooms, in which is displayed a complete range of the smaller domestic appliances such as fires, kettles, coffee percolators, shaving mirrors, toasters, &c., has the walls finished in waxed Japanese oak with skirtings in ebonised mahogany.

A section of the new Manchester showrooms of the Hotpoint Electrical Appliance Co., Ltd.

There are three self-contained sections, the first dealing with clothes washing and ironing machines, the second with electric cookers, breakfast cookers and water-heating appliances, and the third is a complete, modern planned kitchen which, amongst other things, includes a washing-up machine, sink fitted with a disposal unit—an appliance which takes care of the pulverising of all unpleasant "left-overs" from the preparation and aftermath of a meal. This kitchen is complete with electric cooker, refrigerator, food cabinets, planning desk, &c. There is one working level and the sink and the tops of the base cabinets are finished in stainless steel. The working level is illuminated by indirect architectural lighting. The lighting fittings throughout the showrooms were supplied by Harcourts, Ltd., Birmingham. The main contractors were Furdecor, Ltd., Mortimer Street, London, W.1.

I.E.E. North Midland Students

The committee of the North Midland Students' Section of the I.E.E. has arranged a Section dinner instead of the usual dance. This will be held at the Hotel Metropole, Leeds, on November 25th. Tickets (4s. 6d. each) can be obtained from the hon. secretary or any committee member.

The Paris Fair

The Paris International Trade Fair will be held from May 13th to 29th, 1939. In comparison with the corresponding period of last year the number of exhibitors up to date shows an increase of 10 per cent.

A Coming-of-Age

The Technological Institute of Great Britain, which celebrates its coming-of-age this year, recently issued a booklet to mark the occasion. This contains extracts of messages of congratulation from the technical Press and from some of the students at home and overseas.

Crompton's New Branches

Owing to the rapid expansion of their sales in the south, Crompton Parkinson, Ltd., have found it necessary to establish two additional branches in the area previously serviced by their London branch. These are being opened towards the end of this month at Dunstable Road, Luton, and 30, Commercial Road, Portsmouth. The rapid growth of Luton makes it an especially suitable town for a branch serving the counties of Bedford, Berkshire, Buckinghamshire, Cambridgeshire, Hertfordshire, Huntingdonshire, Oxfordshire and Northamptonshire. The Portsmouth-Southampton district has a population of nearly half a million and is the most thickly populated area on the South Coast. Two other Crompton depots have recently been opened in Swansea and Carlisle.

Factory Lighting

We have received from the Benjamin Electric, Ltd., an attractively produced booklet with the title "Make the Most Of It!" which the company is circulating to a large number of factories and the electrical trade throughout the country. This booklet offers advice for the efficient lighting of factories and contains special reference to Benjamin reflectors. There are several illustrations of typical installations.

Road Traffic Control

On November 11th Mr. H. J. N. Riddle, of the Siemens and General Electric Railway Signal Co., Ltd., delivered a lecture entitled "The Electrical Arrangements of Road Traffic Control

Systems " to the Radio, Physical and Television Society. The lecture was illustrated both by lantern slides and apparatus. Particular attention was paid to traffic control systems at Notting Hill Gate and in Oxford Street and several maps of these districts were shown. Particulars of the Society's activities may be obtained from the hon. secretary at 72A, North End Road, West Kensington, W.14.

Calendar

The 1939 calendar of the North Metropolitan Electric Power Supply Co. once again contains some excellently produced photographs of beauty spots within the company's area of supply. In addition to the monthly sheets there are calendars for 1938, 1939 and 1940 at the back. Copies of the calendar are being sent to each of the company's 300,000 consumers.

Cookers for a Dockyard

The Admiralty has placed an order with the General Electric Co., Ltd., for nearly a hundred electric cookers for the personnel of a dockyard abroad. These cookers are to be fitted with radiant hotplates and automatic control.

Automatic Battery Charger

The Westinghouse Brake & Signal Co., Ltd., reports that it has just completed the manufacture of a battery charger for a Government Department in Poland which is designed for operation on either a 120-V or 220-V, 50-cycle, three-phase supply. Th DC output is used for charging three batteries of forty lead-acid cells each at a maximum current of 40 A. By a system of contactors and relays, when the first battery is fully charged the supply is changed over to the second and finally to the third battery, after which the equipment is automatically closed down. This equipment is believed to be the first of its kind.

A.E.I. Acquires Aircraft Interests

It is reported that John Brown & Co. and Associated Electrical Industries, Ltd., are jointly acquiring approximately 70 per cent. of the shares of the Westland Aircraft Co. The new control will increase the output of the Westland Aircraft plant, to which extensions are already being made. Other work associated with the group will be a scheme of sub-contracting for feeding erecting centres with parts.

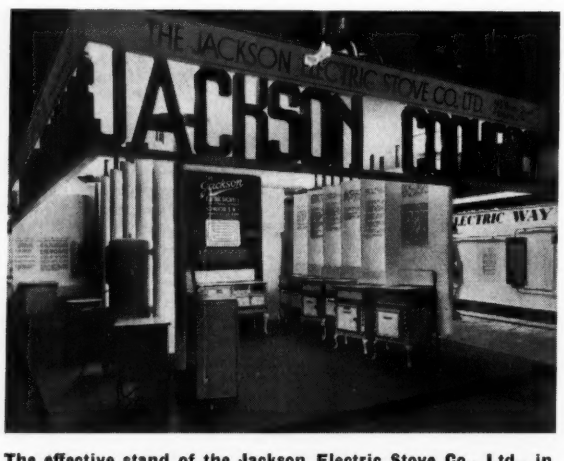
A Battery Deal

A. C. Cossor, Ltd., has purchased Sterling Batteries, Ltd., Dagenham, manufacturers of dry batteries and accumulators. Mr. A. Johnson and Mr. J. H. Thomas, directors of A. C. Cossor, have been appointed to the board of Sterling Batteries.

We are informed by Sterling Batteries, Ltd., that it is no longer controlled by, or associated with, the Ismay group of companies. Mr. M. Pordes remains managing director.

British Trade with China

The London Chamber of Commerce states that it has received from an authoritative correspondent in China a letter drawing attention to the danger that British manufacturers and exporters may be led to believe it necessary to appoint Japanese firms to handle their business in Northern China because they think the position there makes it impossible for British concerns to serve their interests effectively. The correspondent points out that although Japan has, on paper, elaborate monopolistic plans for that area, they are not yet in fact



The effective stand of the Jackson Electric Stove Co., Ltd., in the electrical section of the Woman's Fair, Olympia

effective and may not become so if resolute action is taken by this country to maintain its position. Although a large part of Northern China is under Japanese military control, this is more apparent than real, and there is a strong underlying antagonism on the part of the Chinese, even where they are forced to submit to restrictive measures in their trade. Anything that can be interpreted as a capitulation on the part of British interests to Japanese pressure will certainly adversely affect British standing with the Chinese. The point is stressed that even if British firms were represented by Japanese houses it is obviously unlikely that they would receive any orders which could possibly be placed in Japan; that, in spite of Japanese military control, the Chinese in Northern China are exercising a fairly effective boycott of Japanese goods and traders; that the appointment of Japanese agents would prejudice British interests in the eyes of the Chinese, and that in the present circumstances it is essential that British traders should present a united front.

Institute of Vitreous Enamellers

An extraordinary general meeting of the members of the Institute of Vitreous Enamellers will be held at the Chamber of Commerce, New Street, Birmingham, on January 10th to consider whether No. 28 of the Articles of Association should be altered so as to render valid the nomination and election of suppliers and others to the Council of the Institute.

B.I.F. Posters

Posters in two sizes are now available drawing attention to next year's British Industries Fair. Printed in bold colours, they bear the familiar " key " sign. Smaller sheets for hanging on a wall are also being issued.

An Exhibition of Designing

Less than two years ago the Reimann School was established in London for the purpose of creating a source of supply of fully competent designers. Judging from the register of employment available to potential employers, the results obtained have proved the need for such a source and its value. The school now boasts two hundred students, who are fairly evenly distributed between the four main departments of commercial art, display and exhibition, fashion and dressmaking, and photography. Another department just inaugurated deals with interior design. Until the end of this month an exhibition of students' work is being held at the school, 4-10, Regency Street, S.W.1.

Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances:—

CHEMICALS, ETC.	Price November 16th	Fortnight's inc. or dec.
a Acid Oxalic ... ... per cwt.	50s.	—
o Ammoniac, Sal ... ... per ton	£37	—
a Ammonia, Muriate (large crystal) ... ,,	£18 10s.	—
a Borax ... ... ,,	£17	—
a Copper, Sulphate ... ... ,,	£19	—
a Potash, Chlorate ... ... per lb.	3¾d. to 4¼d.	—
a ,, Perchlorate ... ... ,,	6d.	—
a Shellac ... ... per cwt.	£4 8s.	—
a Sulphur, Commercial ... ... per ton	£11	—
a ,, Roll ... ... ,,	£11	—
a Soda, Chlorate ... ... per lb.	3¾d. to 3¾d.	—
a ,, Crystals ... ... per ton	£5 to £5 5s.	—
a Sodium, Bichromate, casks ... per lb.	4¼d. net.	—
METALS, ETC.		
b Aluminium, Ingots ... ... per ton	£94	—
b ,, Wire ... ... per lb.	1/1 to 1/9	—
b ,, Sheet and Foil ... ... ,,	1/2½ to 2/9	—
p Babbits Metal and Anti-friction Metals—		
Grade I ... ... per ton net	£181	—
Grade II ... ... ,,	£127	—
Grade III ... ... ,,	£70	—
c Brass (rolled metal 2" to 12" basis)... per lb.	8¼d.	—
c ,, Tubes (solid drawn) ... ... ,,	1/- to 1/0½d.	—
c ,, Wire, basis ... ... ,,	8¾d.	—
c Copper Tubes (solid drawn) ... ... ,,	1/1¼d.	—
g ,, Bars (best selected) ... per ton	£84	—
g ,, Sheet... ... ... ,,		—
g ,, Rod ... ... ,,		—
d ,, (Electrolytic) Bars ... ... ,,	£53 5s.	5s. dec.
d ,, ,, Wire Rods ... ... ,,	£58	5s. dec.
d ,, ,, H.C. Wire ... per lb.	8 3/8d.	—
f Ebonite Rod ¼" dia. & up. ... ,,	1/10 to 2/5	—
f ,, Sheet ⅛" thick & up ... ,,	1/5 to 1/10	—
n German Silver Wire, Nos. 1 to 12 ... ,,	2/4	—
h Gutta-percha, fine ... ... ,,	nom.	—
h India-rubber, Para-fine ... ... ,,	8d.	—
i Iron, Pig (Cleveland, No. 3) ... per ton	£4 5s.	—
i ,, Wire galv. No. 1 P.O. Qual.... ,,	£23	—
g Lead, English Pig ... ... ,,	£18	5s. dec.
g Mercury ... ... per bot.	£14 5s.	5s. inc.
e Mica (in original cases) small ... per lb.	10d. to 2/–	—
e ,, ,, ,, medium ... ,,	6/– to 12/6	—
e ,, ,, ,, large ... ,,	13/– to 17/6 up	—
p Phosphor Bronze, plain castings ... ,,	1/2½	—
p ,, ,, drawn bars & rods ,,	1/1½d.	—
p ,, ,, rolled strip & sheet ,,	11¾d.	—
p ,, ,, wire ... ... ,,	1s. 1¾d.	—
o Platinum ... ... per oz.	£7 10s.	10s. dec.
d Silicium Bronze Wire ... ... per lb.	9½d.	—
g Spelter ... ... per ton	£14 7s. 6d.	8s. 9d. dec.
g Tin, Block (English) ... ... ,,	£215 15s.	£2 15s. inc.
n ,, Wire, Nos. 1 to 16 ... ... per lb.	3/6	—

Quotations supplied by:—

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India Rubber, Gutta Percha and Telegraph Works Co., Ltd.
g Henry Gardner & Co., Ltd.,
h Edward Till & Co.
i Bolling & Lowe.
n P. Ormiston & Sons.
o Johnson Matthey & Co.
p C. Clifford & Sons, Ltd.

The above table is published here fortnightly. In alternate issues, in which it does not appear, the latest prices of copper, silicium bronze wire, lead, rubber, tin and spelter, up to the time of going to press, are given in this section under the same heading.

A Lamp Museum

An electric lamp museum was opened by Dr. A. P. M. Fleming, Pres.I.E.E., on Monday last at the premises of the Edison Swan Electric Co., Ltd., 155, Charing Cross Road, London, W.C. The exhibits are of historic interest and have been accumulated since 1878 when Joseph Swan made the first incandescent electric lamp. Among them are the first commercial lamp, produced in 1881; the first "pipless" lamp, produced in 1883; the first electric street lamp, produced in 1891; miners' lamp bulbs, ships' and railway lamps, and surgical and ophthalmic lamps. At the opening ceremony Dr. Fleming was introduced by Mr. E. A. Gimingham, a director of the Edison Swan Co., while amongst distinguished representatives of the electrical industry were Lord Hirst, Sir Felix Pole and Col. Sir T. F. Purves.

The E.I.B.A. Ball

Readers are reminded that the ball organised by the E.I.B.A. takes place on Tuesday next at Grosvenor House, Park Lane, London, W. Tickets (25s. each) can be obtained from the Association, 6, Southampton Street, London, W.C.1.

New Catalogues and Lists

Dowsing Co. (Electrical Manufacturers), Ltd., Kangley Bridge Road, Lower Sydenham, London, S.E.26.—Catalogue No. 215, dealing with electric irons for all purposes.

Philips Lamps, Ltd., 145, Charing Cross Road, London, W.C.2.—A leaflet describing the new Type 555A press-button receiving set.

Mosers, Ltd., 170-192, Borough High Street, London, S.E.1.—A 63-page illustrated catalogue of electrical accessories, including switchgear, cables and reflectors.

Joseph Lucas, Ltd., Great King Street, Birmingham, 19.—A catalogue of "King of the Road" electrical motoring accessories.

W. T. Henley's Telegraph Works Co., Ltd., Holborn Viaduct, London, E.C.1.—Folder 436 in which is arranged an alphabetical list of Henley products referring to more than 175 items; also a novelty folder showing the actual size of the 15-A s.p. "Isco" fuse.

R. Cadisch & Sons, Red Lion Square, London, W.C.1.—The company's latest general catalogue covers a much wider range than hitherto. There are 200 pages and well over a thousand illustrations.

Thermega, Ltd., 51-53, Victoria Street, London, S.W.1.—Details of electric blankets, heating pads and mats.

Brookhirst Switchgear, Ltd., Northgate Works, Chester.—A leaflet describing the "Isofuse."

M. & C. Switchgear, Ltd., Kelvinside Works, Kirkintilloch, Glasgow.—A pamphlet (R63/2B) dealing with the Type A 251 AC contactor starter for squirrel-cage motors.

Osler & Faraday, Ltd., 89-91, Newman Street, London, W.1.—A booklet describing and illustrating, complete with light output curves, the "Megaphos" Series II lighting fittings.

Franco Signs, 25-27, Oxford Street, London, W.1.—A booklet dealing with neon sign installations.

Drake & Gorham Wholesale, Ltd., 77, Long Acre, London, W.C.2.—A price list of electrical accessories.

Wailes Dove Bitumastic, Ltd., Collingwood Buildings, Newcastle-upon-Tyne, 1.—An unusual folder designed to show at a glance the various uses of the company's different "Bitumastic" industrial protective coatings.

Concealed Heating Co., Ltd., 7-9, Baker Street, London, W.1.—A folder describing the "Good Companion" bed warmer.

Barimar, Ltd., 14-18, Lambs Conduit Street, Theobald's Road, London, W.C.1, has issued a 32-page booklet setting out details with illustrations of large repairs which have been carried out during the past eighteen months.

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.—A 24-page booklet dealing with water heating contains considerable technical data and advice to enable the potential customer to choose the most suitable type of heater.

Ferranti, Ltd., Hollinwood, Lancs.—A catalogue (IN.14) of multi-range testing sets.

Allen West & Co., Lewes Road, Brighton, 7.—A booklet dealing with recent developments by the company.

Ruston & Hornsby, Ltd., Lincoln.—Details of a new series of Diesel lighting sets from 1¾ to 25 kW.

Bankruptcy Proceedings

W. G. Holt, 7, Shalford Road, South Yardley, Birmingham, electrical contractor.—This debtor's public examination took place at the Court House, Corporation Street, Birmingham, on November 9th. His deficiency amounted to £364. In reply to questions he said that he had done certain work below cost price through underestimating. Keen competition had affected his business, and he admitted that he had drawn in excess of the profits. The examination was closed, subject to the signing of the notes.

G. S. Newlove, 74, Crosby Avenue, and lately 42, Dale Street, both Scunthorpe, electrical contractor.—At the public examination held at the Town Hall, Gt. Grimsby, recently, the statement of affairs produced showed gross liabilities of £665, of which £176 was expected to rank for dividend, and there were estimated assets of £85, leaving a deficiency of £91. Debtor attributed his failure to lack of capital, overhead charges, and unprofitable workmen. The examination was adjourned.

F. Adams and **R. Barlow,** lately trading together and described in the receiving order as Adams and Barlow, of and carrying on business at 11, Station Parade, Wanstead, London, electricians. (Separate application of F. Adams).—Application for discharge to be heard at Bankruptcy Buildings, Carey Street, London, W.C.2, on November 30th.

C. H. Chadwick, radio dealer, Mill Road, Cromer, Norfolk.—Last day for receiving proofs for dividend November 23rd. Trustee, Mr. F. R. D. Walter, Castle Chambers, Opie Street, Norwich.

W. B. Smithers, electrical contractor, 11, Lunt Grove Avenue, Birmingham, lately carrying on business at 11, Oakwood Close, Dartford.—Last day for receiving proofs for dividend November 24th. Trustee, Mr. F. C. Wells, 280a, High Street, Rochester, Official Receiver.

G. Hopkinson, radio engineer and wireless dealer, 84, Derby Road, Chesterfield.—Receiving order made November 8th on debtor's own petition.

R. G. Littlewood, radio specialist, 19, Burnt Ash Road, Lee Green, London, S.E.12.—Receiving order made November 7th on debtor's own petition.

E. F. Hunt, radio and electrical dealer, "St. Albans," Cherry Chase, Tiptree, Essex, lately trading with another as Hunt's Radio Service, Cameron House, High Street, Ingatestone.—Discharge suspended for two years until October 10th, 1940.

W. A. Mather (Mather's Stores), wireless dealer, 77, Widnes Road, Widnes.—Last day for receiving proofs for dividend November 26th. Trustee, Mr. J. Allcorn, Government Buildings, Victoria Street, Liverpool.

Company Liquidations

Attwoods (Factors), Ltd., Attwood House, Fryer Street, Wolverhampton, radio and electrical factors, &c.—The creditors were called together on November 8th at the Institute of Chartered Accountants, Moorgate Place, London, E.C. The statement of affairs showed ranking liabilities of £24,497. The net assets were £7,616, leaving a deficiency, as regarded the creditors, of £16,881. The issued capital was £6,000, and so far as the shareholders were concerned there was a deficiency of £22,881. Mr. H. J. Attwood, who presided, stated that he started in business in 1924 and the company was registered in 1929. For many years the business was successful and the increased capital required was furnished by him from his private resources and by the issue of debentures. The company had an organisation for a turnover of £120,000 per annum, of which about half was radio. The period of unsuccessful trading commenced with the reduction of factors' discounts on radio goods, and a loss was sustained for the first time in 1936. Steps were then taken to reduce the overhead expenses and certain branches were closed. The business was reorganised in order to deal with the reduced turnover, but unfortunately the general recession in trade towards the end of 1937 still further affected the business and the expenditure could not be reduced sufficiently to meet the lower turnover. In the early part of the present year it became apparent that the capital charges were too heavy for the business obtainable and it was decided that overtures should be commenced with a view to the disposal of the business as a going concern. Negotiations to that end were commenced last May and for some time it was hoped that more than sufficient would be obtained to discharge the whole of the liabilities in full. Finally, however, it became evident that those hopes could not be fulfilled and the debenture holders had appointed a receiver. An agreement had been entered into for the sale of the assets at the figures appearing in the statement of affairs. The purchasers, however, had agreed that if more favourable terms could be obtained within seven days then their offer could be annulled. It was further stated that the offer was being made by Brown Bros. There would be a dividend for the creditors which would be substantial. A resolution was passed confirming the voluntary liquidation of the company with Mr. C. Latham, 185-188, High Holborn, London, W.C., as liquidator. A committee was also appointed, consisting of Messrs. F. E. Bendall (Bendall, Poppleton and Appleby), A. Cripwell (the British Traders' Association), H. J. Attwood, and the representatives of the General Electric Co., Ltd., and the Ultra Electric Co., Ltd.

John Holder & Co., Ltd., electrical engineers and contractors, 80b, Dean Street, W.—The first meeting of creditors and shareholders under the compulsory liquidation of this company was held on November 11th at Carey Street, W.C. Mr. H. P. Naunton, Official Receiver, reported that the company was incorporated in November, 1933, to continue a business formerly carried on by John Holder. The issued capital was only £2 and the company carried on with credit granted by its suppliers and overdraft facilities. Debentures were issued and on April 26th, 1938, Mr. C. H. Travis, F.C.A., was appointed receiver and manager for the debenture holder. Mr. Holder attributed the failure of the company to shortage of liquid capital, increased overhead expenses, errors in estimating contracts, general slackness of trade and difficulty in collecting accounts due to the company. A draft statement of affairs was submitted showing unsecured debts of £2,964, preferential claims £18 and debentures £493. The receiver estimated that about £900 would be realised from the assets. No resolution was passed at the meeting and the liquidation was left in the hands of the Official Receiver.

District Electric, Ltd., 6, Ballard Lane, Finchley, London, N.3.—At a meeting of the creditors the statement of affairs disclosed ranking liabilities of £7,975. The net assets were £2,181, leaving a deficiency of £5,794 so far as the creditors were concerned. It was stated that one of the directors had deposited a cheque with the accountants for a sum sufficient to pay the creditors a first and final dividend of 6s. 8d. in the £ immediately. The voluntary liquidation of the company was confirmed with Mr. A. H. Hughes, 36, King Street, E.C., as liquidator.

R. A. Bargate, Ltd., radio dealers, &c., Fore Street, Exeter.—At a meeting of the creditors of the above a resolution was passed confirming the voluntary liquidation of the company, with Mr. G. O. Boundy as liquidator. A committee was also appointed. The statement of affairs showed ranking liabilities of £4,393 and net assets of £2,401, leaving a deficiency, as regarded the creditors, of £1,992. The issued capital was £801, and so far as the shareholders were concerned there was a deficiency of £2,793.

Drabble's Radio, Ltd.—Meeting December 20th at King Edward House, New Street, Birmingham, to receive an account of the winding up by the liquidator, Mr. F. E. Bendall.

David Jefferson, Ltd.—Winding up voluntarily. Liquidator, Mr. W. Vale, 105, Duke Street, Barrow-in-Furness.

Magnaphone, Ltd.—Particulars of claims by December 31st to the liquidator, Mr. F. E. Bendall, 4, Charterhouse Square, E.C.1.

Electricity Supply

Lighting, Domestic, Power

Ashford.—RURAL SUPPLIES.—The East Ashford Rural District Council is to ask Mr. W. Spens, M.P., to take up the matter of electricity supply to outlying villages in the district.

Berkshire.—BULK SUPPLY LINE.—The Wessex Electricity Co. is to erect an overhead line to transmit a bulk supply of electricity to Henley, Marlow and Wycombe.

Brighton.—EXTENSIONS TO GENERATING PLANT.—Approval has been given by the Town Council to the extension of the Southwick generating station at an estimated cost of £344,000. The work is to be completed by September, 1940. The extension will provide for the installation of two boiler units, each with a maximum continuous evaporative capacity of 215,000 lb. of steam per hour, and the Council has approved the placing of the order for these boiler units with Babcock & Wilcox, Ltd., at a cost of £190,000, including ancillary apparatus.

SUB-STATION.—The Town Council has approved the plans of a new sub-station to be built at the rear of Hollingbury Road.

Bury St. Edmunds.—STREET LIGHTING.—The Town Council has adopted a recommendation of the Highways Committee for the provision of lighting along the Newmarket Road, west of the existing lighting, by the East Anglian Electric Supply Co.

Colchester.—NEW MAINS.—Subject to the consent of the Ministry of Transport the Town Council has decided to extend the low-voltage supply to Jays Lane, Marks Tey; and Cavendish Avenue and Hadleigh Road, East Bergholt. It is proposed to apply for sanction to the borrowing of £48,000, made up as follows: mains and services, £16,000; domestic apparatus, £21,000; wiring installations, £2,000; meters, £6,000; and sub-station equipment, £3,000.

Douglas (I. of M.).—EXTENSION.—The Electricity Committee is to extend the mains from Tromode to Strang at a cost of £376.

Durham.—OVERHEAD LINES.—The County Council has granted wayleaves to the North-Eastern Electric Supply Co., for the erection of overhead lines over sections of the Chilton East House Farm.

Eccles.—NOTABLE INCREASE IN SALES.—A chart showing the progress of the undertaking since 1926 indicates that the past year's improvement in sales of 18 per cent. was exceptionally large. Half of the total sales of 15.6 million kWh was supplied for industrial power, most of the large works in this busy Manchester suburb having electrically driven machinery. Last year supplies of this type increased by over 19 per cent., and there was a similar rate of expansion in electricity sold for private lighting, heating and cooking. At the end of March there were 8,696 domestic consumers and the Department had on hire 1,260 electric cookers. Further conversions from gas to electric public lighting took place during the year and at the end of the period there remained only 212 gas lamps as compared with 1,670 electric. Other interesting facts contained in the report of the borough electrical engineer, Mr. C. V. Johnson, are that of the total of 13,217 premises in the area 76 per cent. are connected to the mains, and that the sales for private supply per head of the population rose from 278 to 332 kWh, the number of consumers increasing by 763 to 10,038. The average price obtained per kWh sold fell from 1.295d. to 1.195d., the charges for public lighting and traction having been reduced.

Essex.—SUPPLY TO WRITTLE.—Arrangements have been concluded for the County of London Electric Supply Co., Ltd., to provide a high-voltage supply to the East Anglian Institute of Agriculture, Lordships Farm, Writtle, the County Council to guarantee a revenue of £500 per annum for five years.

Fareham.—ELECTRICITY CHARGES.—The proposal for a 50 per cent. increase in electricity charges which was recently referred back by the Urban District Council is not to be proceeded with. The Lighting Committee reported last week that negotiations for a reduction in the bulk supply charges were still in progress, and it was decided to recommend that no alteration should be made at present in the charges to the consumers, but that the whole question should be reviewed as soon as the undertaking's accounts for the financial year 1938-9 were completed.

Glasgow.—ELECTRICITY FOR A SCHOOL.—The Education Committee has agreed to the electrical installation at Provanmill Temporary School extension being carried out by the Electricity Department at an approximate cost of £719.

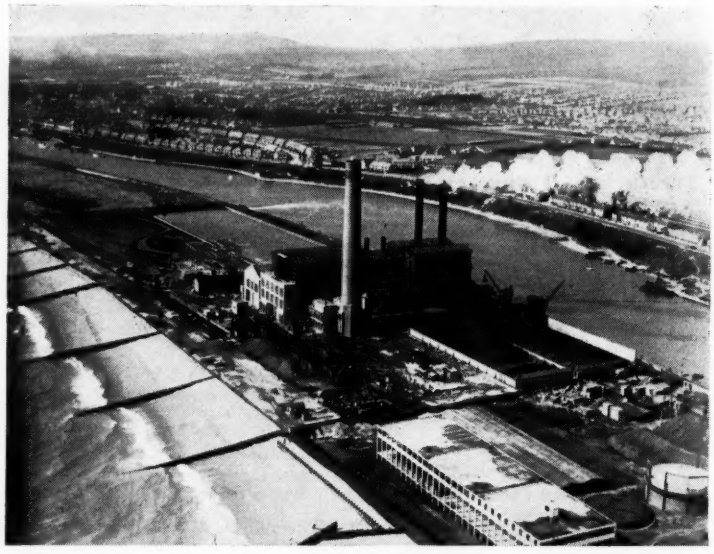
ELECTRICITY AT SEWAGE WORKS.—The Sewage Committee has arranged for the Electricity Department to supply and fit new electrical equipment, estimated to cost £1,000, at Shieldhall sewage works.

Gravesend.—METERS.—Sanction is being sought by the Electricity Committee to a loan of £4,000 for meters.

MAINS.—The Electricity Committee is to extend the mains at a cost of £420 to supply houses being built in Bourne Road.

Hull.—MAINTENANCE OF FISH RANGES.—In view of the large number of fish-frying ranges now connected to the mains facilities for the maintenance of the electrical portion of the ranges are to be made available at an annual charge of £3 10s.

HOSPITAL HEATING.—After consultation with the general manager of the Electricity Department the city architect has received an amended estimate of the cost of the electrode boilers and circulators required in connection with the heating and hot water supply services for the proposed new accommodation at the City Hospital, Cottingham, amounting to £3,255; this is £496 lower than the original estimate.



An aerial view of the Southwick power station, Brighton, where extensions are to be carried out at a cost of £344,000

Liverpool.—SUB-STATION DESIGN.—The Electricity Department has erected a sub-station of special design at Childwall. It is constructed of semi-rustic brick wih the features picked out in purple brick. All the pointing is being done in cream-coloured mortar. The flat roof is surmounted by a vent with metal grilles at each side.

REDUCED CHARGES.—The Electric Power and Lighting Committee has adopted reductions in the electric tariff amounting to nearly £43,000 per annum. The reductions are subject to confirmation by the City Council and will come into operation on January 1st, 1939. They include a decrease of the rateable value fixed charges from 15 per cent. to 12½ per cent., plus ½d. per kWh up to 750 kWh per quarter. The present fixed charge of 1s. 2d. per week on Corporation house rentals, plus ½d. per kWh for light and power, will be reduced to 1s. per week and ½d. per kWh. An option will be given to commute hire rentals for electrical apparatus to 4d. per week to be added to the fixed charge of 1s. per week.

Lowestoft.—REQUEST FOR ALTERNATIVE SUPPLY.—At a recent meeting of the Town Council what was described as an unsatisfactory reply was reported to have been received from the Electricity Commissioners in answer to a suggestion from the Council that the town should have available a supply from Ipswich as an alternative to the present supply from Yarmouth. The Commissioners stated that the Central Electricity Board had a line between Ipswich and Yarmouth, but that as the maximum demand from Lowestoft was 4,000 kW and the town was eight miles from the nearest point on the line, the cost of "breaking down" the grid and establishing a direct connection to Lowestoft at an expenditure of £100,000 was not justified. To meet the possibility of a breakdown in an emergency the National Council on A.R.P. had suggested a pool of emergency switchgear and transformers. It was further reported to the Council that a letter from the Committee of Smaller Municipal Electricity Supply Undertakings strongly criticised the National Joint Board's proposal that only undertakings with an output of not less than 8,000 kW should be eligible to train engineers.

Middlesbrough.—Application is being made by the Town Council to borrow £5,000 for mains extensions and alterations to sub-station equipment to meet the demands from the new refuse destructor.

Sunderland.—CABLES.—The Town Council is to lay a cable along Fawcett Street at a cost of £341.

COOKERS ON HIRE.—Small electric cookers are to be purchased and let out on hire.

Tynemouth.—CABLES AT CHIRTON.—The Town Council has approved plans for laying high-voltage electric cables at Chirton.

LOANS.—Application is being made by the Town Council for sanction to borrow £10,000 for mains and services and £3,000 for sub-station equipment.

Wakefield.—CHEAPER ELECTRICITY.—The Electricity Committee has reduced the charges for lighting as follows: first 250 kWh per quarter reduced from 4½d. to 4d. per kWh; 251-1,000 kWh per quarter from 3½d. to 3d. per kWh; prepayment meters, reduction of ½d. per kWh.

Overseas

Australia.—SYDNEY.—The Electric Light & Power Supply Corporation, Ltd., Sydney, which operates a steam driven station at Balmain and supplies Balmain and four adjacent municipalities, with a total population of approximately 180,000, connected 1,177 new consumers during the year ended April 30th last. Gross profit, after providing for generation, distribution and maintenance costs, was £213,884, against £201,138 in the preceding year, and net profit was £73,316.

Baltic States.—POWER CONFERENCE.—The extensive electrification schemes which are now in progress in the Baltic countries were discussed at a meeting recently held at Riga and attended by representatives of Latvia, Lithuania and Estonia. The possibilities of inter-State power exchange were considered and it was decided to hold a Baltic Conference on Power Economy at Riga next year. In the meantime data will be compiled on uniform power tariffs and the exchange of power through inter-State trunk transmission lines.

Belgium.—DOMESTIC ELECTRICAL PROGRESS.—The report of the Société d'Electricité de l'Est de la Belgique for the year ended June 30th shows that the undertaking is now supplying power to 58,651 consumers as compared with 57,142 at the corresponding date in 1936-37, while the load on the station increased from 69,179 to 73,415 kW. The increase in the load is wholly due to the increasing popularity of domestic electrical appliances. Thus the lighting and power supply loads both show a slight decrease while that in respect of household appliances advanced during the twelve months from 14,318 to 18,916 kW. During the year 725 electric cookers and 160 electric water heaters were sold in the company's area, bringing the total of such appliances in use up to 2,700 and 650 respectively.

Canada.—INDUSTRIAL ELECTRIFICATION.—Our Montreal correspondent states that an official report just issued shows that in manufacturing the proportion of electric to other types of drive rose from 77.9 per cent. in 1935 to 78.6 per cent. in 1936, while in mining there was an advance from 75.7 to 76.3 per cent. Between 1923 and 1936 the capacity of electric motors in use rose from 1,300,000 to 3,500,000 HP.

Germany.—ELECTRIFIED VILLAGE EXPERIMENT.—The complete electrification of the village of Saulwitz and the installation of domestic appliances throughout, carried out in 1935, has been followed with considerable interest by German electricity companies. During the tests the electric cookers consumed 13,000 kWh in one year. In the year following the tests (1936) this dropped to 10,000 kWh, and in the second year to 9,600 kWh, probably due to consumers becoming more familiar with them and wasting less electricity. Consumption of water heaters amounted to 30,000 kWh during the tests and to 24,300 and 24,600 kWh during the succeeding years. Heaters for animal food, on the other hand, consumed 27,200 kWh during tests and 24,100 and 28,300 kWh during the succeeding years. Most interesting were the figures for lighting and small power requirements. These totalled 7,900 kWh during the test year, and 9,400 and 10,300 kWh during the following years. The total consumption of the village, amounting to 81,100 kWh during the year's test, dropped in the following year to only 69,900 kWh. In the second year, however, it rose again to 75,000 kWh. The figures are viewed with considerable satisfaction.

India.—ADMINISTRATION IN BENGAL.—We have received from Mr. S. W. Redclift, the electrical adviser and chief inspector, his report on the administration of the Indian Electricity Act, 1910, in Bengal for the year ended December 31st, 1937. Twenty-one examinations in connection with the granting of certificates of competency for supervisors and permits for electrical workmen were held during the year. Licences to supply electricity were granted for Nabadwip, Natore, Jessore, Faridpur, and Kalimpong, and at the end of the period draft licences had been published for Jhalakati and Suri. Work in connection with the new power station at Mulajore made steady progress. At Darjeeling lack of water was still a serious problem despite the installation of modern high efficiency plant. The number of accidents reported was fifteen fatal and forty-three non-fatal against twelve and forty-two respectively in 1936. The chief causes were accidental charge through leakage and overhead lines. The amount of electricity sold during the year by the larger undertakings was as follows: Calcutta Electric Supply Corporation, Ltd., 311.4 million kWh, Gourepore 29.4 million kWh and Associated Power (Bengal), 7.5 million kWh. The Gourepore undertaking has mainly a jute mill load and a bulk supply to two smaller companies while the Associated Power (Bengal) supplies chiefly in connection with collieries and a bulk supply to Raneegunj.

ELECTRICAL PROGRESS IN MADRAS.—The latest report of the Electricity Department of the Madras Government shows that the maximum load has been reached by the Pykara scheme and that the chances of a good demand for power from other schemes are most promising. The electrical engineer has suggested the holding of exhibitions of electrical goods and machinery calculated to interest the public in the use of electricity. One will be held at Coimbatore next year. The need for greater diversity of load is realised, the Pykara project depending too much on the demand from the textile industry.

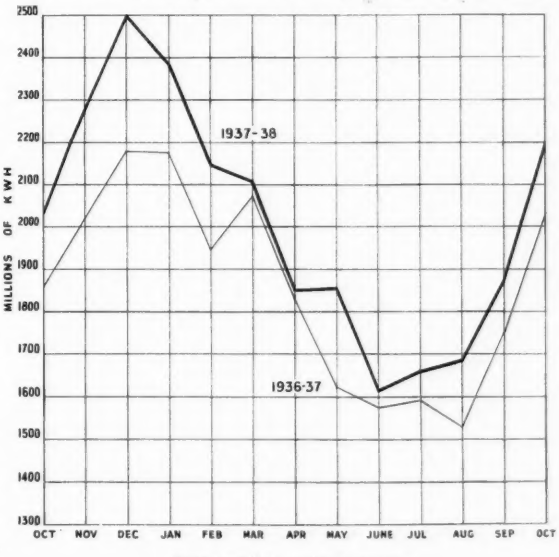
DELHI ELECTRICAL AFFAIRS.—The Delhi Municipality is anxious to develop its own supply of electricity and has applied to the Government for a distribution licence. The present Delhi Electrical Co.'s licence does not expire until 1947, and if the application is granted two undertakings will be distributing electricity in the same area. The chief reason for the Municipality desiring to undertake the enterprise is that the company is not prepared to reduce its charges.

PUNJAB HYDRO-ELECTRIC DEVELOPMENT.—The latest report on the Uhl River scheme in the Punjab shows an all-round improvement. The connected load increased by 21 per cent. from 25,900 to 30,400 kW, while the peak load rose by 18 per cent. Among the measures taken to popularise the use of energy are the halving of meter rents and the introduction of a low combined tariff for domestic lighting, fans, &c. Investigations are being carried out into the possibilities of power-driven tube well irrigation. With steady development, the average cost of generation per kWh sold is falling, and the full development of the Uhl River scheme will effect a great reduction in the cost of generation.

Sweden.—ARCTIC POWER.—Among the most important of several works at present being executed in Sweden with a view to exploiting more of Sweden's vast water-power resources is the construction of a large reservoir on the Lule River, in northernmost Lapland. In 1919-23 the Swedish Board of Waterfalls built a great dam system at Suorva, above the Arctic Circle, in order to obtain a reservoir of water from the chain of lakes in the valley of the Great Lule River. The spring floods are collected there during the summer and tapped during the autumn and winter through outlet tunnels under the dam, and subsequently turned to use by the large Porjus power station which is at present being extended to 100,000 kW. According to the *Anglo-Swedish Review* work is now in progress on an extension of the Suorva dam, constituting the second stage of the regulation of the waters west of the Lilla Sjöfallet, the smaller of the two "lake falls" in the valley of the Lule River. The old 8.5 m. high dam will be raised by 7 m. The east branch will be 315 m. long in nineteen arches, while the west branch will be 285 m. long in thirteen arches. Under this scheme, estimated to cost about £221,600, which was commenced in March this year and is expected to be completed by about 1941, the chain of small lakes in the upper valley of the Lule River will be made into one great lake about forty miles long and four miles wide—as big as Torneträsk, Lapland's largest lake—with a capacity of 2,000,000,000 cu. metres. A labour force of between three and four hundred is engaged on the work.

Generation of Electricity in October

OFFICIAL returns rendered to the Electricity Commissioners show that 2,195 million kWh was generated by authorised undertakings in Great Britain during the month of October, 1938, as compared with the revised figure of 2,029 million kWh in the corresponding month of 1937, representing an increase



Comparative output curves

of 166 million kWh, or 8.2 per cent. The number of working days in the month (*i.e*, excluding Sundays) was twenty-six, the same as last year.

During the ten months of 1938 up to the end of October the total amount of electricity generated by authorised undertakings was 19,355 million kWh, as compared with the revised figure of 18,120 million kWh for the corresponding period of 1937, representing an increase of 1,235 million kWh, or 6.8 per cent.

Traction

Argentina.—IMPROVED TRAMS.—The recently formed Buenos Aires Transport Corporation is taking delivery of a large number of 40-seater single-deck trams of quite new design. The electrical equipment has been obtained from the United States, and is the same as that of the P.C.C. (Presidents' Conference Committee) trams; it includes two 250/300-V motors permanently coupled in series to work from the trolley voltage of 550. The rating per motor is 55 HP and the weight, including gears, 1,450 lb. Rheostatic brakes are fitted.

Brighton.—PREPARATION FOR TROLLEY-BUSES.—Approval has been given to the acceptance of the tender of Clough Smith & Co., Ltd. (£30,990) for the conversion of the existing tramway routes to trolley-bus overhead equipment. The total length is just over 11 miles.

Eire.—ELECTRICAL SIGNALLING.—Within a short time all trains of Great Southern Railways (Ireland) entering Dublin will be controlled by means of electrically operated signals. The new all-electric signal-box at Kingsbridge main city terminus is already in operation.

France.—UNUSUAL LEVEL CROSSING CONTROL SYSTEM.—A system of railway level crossing control being tried in France is based on the principle that a road vehicle driver is obliged to slow down, or stop, when he enters a dazzle zone. On each side of the crossing at about 50 to 75 yd. from the track are two 12 ft. columns supporting lamps so focused that they form a beam the full width of the road. At about 200 yd. there is a single smaller column of similar construction but with a less powerful light to serve as a warning of an approaching crossing. From each column a narrow pencil of light is projected upwards so that the presence of the crossing is indicated at a considerable distance, even when the columns are masked by intervening trees or bends in the road. Both the lights and sound signals are operated when a shoe on the locomotive comes into contact with a rail placed either between the two running rails or at one side.

Germany.—RAILWAY ELECTRIFICATION.—The length of the electrically operated State railways at the end of 1937 is stated to have been 2,284 km., and inclusion of the similarly worked lines in Ostmark (Austria) increases the total length to 3,181 km. Further extensions are now in progress.

Glasgow.—TRANSPORT IMPROVEMENTS.—A five-year transport improvement plan costing £2,000,000 has been recommended by a sub-committee of the Transport Committee. The building of 600 luxury tramcars will be put in hand immediately, subject to the approval of the parent committee and the Corporation. Councillor W. Reid, convener of the Transport Committee, explained that the Transport Department has saved almost £1,000,000 out of depreciation during the past five years. It was reasonable to assume that another £1,000,000 could be saved in the next five years, which would be sufficient to pay for the scheme.

Ipswich.—TROLLEY-BUSES.—The Town Council has decided to replace the present circuitous trolley-bus route to the Gainsborough and Greenwich estates by a direct route *via* Duke Street, John Street, Holywells Road and Landseer Road, and the service is to be put into operation as soon as possible. The necessary overhead equipment is to be erected at an estimated cost of £3,600, and this expenditure will come under the Ipswich Corporation (Trolley Vehicles) Order, 1935. It is estimated that the change of route will provide a saving of 52,416 miles of traffic per annum, or 1.17 miles for every journey.

Italy.—IMPORTANT ELECTRIFICATION SCHEME COMPLETED.—Our Italian Correspondent reports that the following lines of the Italian State Railways Administration are being operated by electric traction as from November 14th: Rome-Leghorn (316 km.), Pontegalera-Fiumicino (11 km.), Milan-Bologna (219 km.), Fidenza-Salsomaggiore (10 km.), Fidenza-Fornovo-Parma (48 km.) and Bologna-Ancona (204 km.), a total of 808 km., or more than 500 miles. The high-voltage lines connecting the large power stations with the transforming sub-stations along the lines can be used for the transmission of electricity both for railway traction and industrial purposes forming, therefore, part of the suggested national distribution network. Between Milan, Bologna and Ancona there are eleven sub-stations with a total output of 66,000 kW. In the sub-station buildings an upper floor houses the switchboards, mercury-vapour arc rectifiers and automatic circuit-breakers. On the lower floor are the water-cooling equipment for the rectifiers, the filters, low-voltage equipment and an accumulator battery. In connection with further railway electrification plans the Milan-Chiasso line is to be included in the railways on which the electrification is to be completed next year, and the Italian Cabinet recently decided to allow the construction of an electric railway between Casalecchio and Vignola (Bologna) to be built and operated by the Provincial Administration of Bologna. It also favoured the construction of an electric railway between Biella and Novara.

Jugoslavia.—RAILWAY ELECTRIFICATION PLANS.—The Government has decided to electrify the railway lines between Susak, Skrljevo and Ogulin. The standard Central European system will be used (15,000 V, single-phase, AC), but this raises the problem of making a connection with the Italian 3,000 V, DC lines at Fiume. Power for the new line is to be obtained from a water-power plant to be constructed at Korana.

South Africa.—NEW ELECTRIFIED LINE.—An electric train service between Johannesburg and Pretoria was inaugurated last week, states *The Times*.

Switzerland.—MOUNTAIN RAILWAY ELECTRIFICATION.—The steam-operated rack railway which connects Glion, the mountain village above Montreux, with the Rochers de Naye, has recently been electrified.

New Road Lighting at Lewisham

WHEN the mercury vapour electric-discharge lamp for road lighting emerged from the experimental to the commercial stage early in 1933 Lewisham was one of the first metropolitan boroughs to investigate its possibilities and installed "Osira" lamps throughout most of its principal thoroughfares. Further extensions are to be made immediately, and an order has been placed with the General Electric Co., Ltd., for 140 sets of 250 W lamps, equipment, and "Difractor" lanterns for the lighting of a new arterial double carriageway road (part of the South Circular Road) which has just been completed within the borough. Each carriageway is to be treated as an independent traffic road and in straight stretches there will be two units arranged opposite each other, with a central post top unit in between. On bends the units will be arranged in accordance with the angle requirements of the recommendations incorporated in the final report of the M.O.T. Departmental Committee on Street Lighting. This work will be carried out by the South Metropolitan Electric Light & Power Co., Ltd. A further lighting extension recently decided upon by the Lewisham Borough Council comprises the installation in some 153 miles of highways of 5,900 electric street lighting units consisting of G.E.C. small cast-iron "Di-fractor" lanterns equipped with 200 W "Osram" lamps. These are to be suspended from columns and brackets at a mounting height of 15 ft. The order just placed with the G.E.C. for 5,900 lighting units for the lighting of these 153 miles of streets is said to be the largest of its kind ever placed for a single street lighting scheme.

Size of Television Pictures

EVENTS leading up to the establishment of the public television service, and the elementary principles involved, were the subject of the twenty-fifth Thomas Hawksley lecture recently delivered to the Institution of Mechanical Engineers in London. The lecturer was Sir Noel Ashbridge (of the B.B.C.) and the latter portion of his address was concerned with indoor and outdoor equipment used for the London service of combined sound and vision. He concluded by reviewing the results achieved, with comments on probable future developments, such as the possibility of obtaining additional channels for the establishment of several more transmitters to operate at still shorter wavelengths down to 1.5 metres, and possible ways of linking the stations by radio or underground cables of special types. Finally, Sir Noel reiterated his contention that much larger received pictures were not essential to viewing in comfort. Since it must be assumed that the practical minimum limit to the distance at which a picture was viewed depended to a large extent (although not entirely) on the degree of definition, there was no reason why a picture of 10 in. by 8 in. should not be viewed at a distance of two or three feet if the definition allowed, as when looking at an ordinary photograph. On this basis, it did not seem likely that one would wish to look at a picture in the home measuring, say, 2 ft. by 3 ft., any more than one would wish pictures in an illustrated magazine to be of this size. On the other hand, if large pictures were made available there was no doubt that some people would prefer them, but they would probably find it necessary to place themselves at a correspondingly greater distance. It did not seem sound to him, at any rate scientifically, to say that television would not be satisfactory until a large picture was available. It would be more logical to say that the definition was insufficient to convey enough information.

New Low-resistance Cable

A NEW low-resistance electrical cable for use in motor-cars and aeroplanes is announced at the United States Bureau of Standards. The cable is used to connect the storage battery with the starter and ignition system. It was invented by Dr. Melville A Peters, physicist at the Bureau, and has been a military secret for the past three years while it was being tested and finally placed in use by the Navy. Dr. Peters found that a cable made up of seven strands of stainless steel wire would allow an electrical current to flow much more readily than one made of many strands of copper wire. The Washington Institute of Technology says that the cable makes it possible to start a petrol engine with 30 per cent. less drain on the battery, and gives higher top speed, lower idling speed, longer life for sparking plugs and less interference with short-wave radio.

French Transmission Line Masts

The Transmission Line Commission of the French Union des Syndicats de l'Electricité has recently drawn up a series of new standards for the manufacture of ferro-concrete masts for the support of overhead power transmission lines.

Financial Section

New Companies. Official Returns of Capital. Debenture Charges. Reports of Electrical Companies. Dividend Announcements. Transactions in Stocks and Shares

New Companies Registered

Wolverhampton Electrical Equipment Co., Ltd.—Private company. Registered November 10th. Capital, £3,000. Objects: To carry on the business of manufacturers of and dealers in electrical equipment and goods of all kinds; electrical, hydraulic and mechanical engineers, &c. The directors are: P. L. Turner, "Kilsby," Penn Road, Wolverhampton, I. H. Baker, "Glenhill," Penn Road, Wolverhampton, W. G. H. Rogers, "Broadlands," Showell Lane, Penn, Wolverhampton, and G. Blount, "Hartford," Oxford Road, Banbury. Secretary: W. G. H. Rogers. Registered office: Raglan Street, Wolverhampton.

Philip Gaya, Ltd.—Private company. Registered in Edinburgh, November 5th. Capital, £500. Objects: To carry on the business of electrical engineers, manufacturers of and dealers in all kinds of electrical materials, fittings and equipment, &c. The subscribers are: M. Dalzell, 43, Alclutha Avenue, Dumbarton, and P. Gaya, 100, Gorbals Street, Glasgow, C.5. P. Gaya is the first director. Secretary: M. Dalzell. Registered office: 83, West Regent Street, Glasgow, C.2.

Auto Hygeian Cleansers, Ltd.—Private company. Registered November 10th. Capital, £5,000. Objects: To carry on the business of manufacturers and distributors of and dealers in all kinds of electrical and non-electric scrubbing, mopping and polishing machines. &c. The directors are: J. A. Walkden, Campsie House, Knott End, Fleetwood, F. A. Parkinson, 16, Cavendish Road, Kersal, Salford, and A. J. Babbs, 28, Albert Grove, Longsight, Manchester. Registered office: 70, Henry Street, Ancoats, Manchester.

International Radio and Electric Holdings, Ltd.—Private company. Registered November 10th. Capital, £100. Objects: To acquire any stocks, shares, bonds, policies, debts, &c. The directors are: H. R. A. de Jonge, Little Bartons, Old Bath Road, Sonning, Berks, and R. Hunter, 30B, Southend Road, Beckenham, Kent. Secretary: G. R. Mackay. Registered office: Aldwych House, Aldwych, W.C.2.

Grelco, Ltd.—Private company. Registered November 10th. Capital, £1,000. Objects: To carry on the business of manufacturers of and dealers in electrical accessories of all kinds, plastic mouldings or substitutes, &c. The directors are: D. Poupart and W. M. Bergen, both of "Winterholme," Weston Green Road, Thames Ditton. Registered office: 54, Grafton Way, Tottenham Court Road, W.1.

B. & M. Trading Co., Ltd.—Private company. Registered November 10th. Capital, £500. Objects: To carry on the business of electricians, mechanical engineers, manufacturers and workers of and dealers in electricity, &c. The directors are: E. E. Price, 9, Westfield Hall, Hagley Road, Edgbaston, Birmingham, and T. R. Price, 9, Chad Road, Edgbaston, Birmingham. Registered office: 270, Corporation Street, Birmingham.

Thornton Electric, Ltd.—Private company. Registered November 10th. Capital, £1,650. Objects: To carry on the business of electricians, electrical, consulting and mechanical engineers, makers of and dealers in electric tramcars, manufacturers of and dealers in dynamos, motors, telephones, bells, electroliers, arc and other lamps, electric light fittings and heating and cooking apparatus, &c. The directors are: E. D. Dickson, "Erlestoun," Worplesdon Hill, Woking, and H. G. Thornton, 64, Lavender Hill, Enfield. Solicitors: Pakeman, Son & Read, 28a, Basinghall Street, E.C.2.

Hook Radio, Ltd.—Private company. Registered November 4th. Capital, £100. Objects: To carry on business as dealers in and manufacturers of radio and television sets, &c. The directors are: H. C. Deacon, address not stated; P. N. Thompson and J. H. M. Blake, both of "Wall View," Thames Ditton, Surrey. Solicitors: Heald Johnson & Lister, 118-20, Wardour Street, W.1.

Auditron, Ltd.—Private company. Registered November 4th. Capital, £100. Objects: To acquire the business of radio and electrical engineers carried on by A. C. Geary and H. A Anderson as "Auditron." The directors are: A. C. Geary, 37, The Green, Edmonton; and Mrs. H. A. Anderson, 76, Dorchester Way, Kenton. Registered office: 7, Grange Road, Willesden Green, N.W.10.

Bennett & Brown (Gravesend), Ltd.—Private company. Registered November 4th. Capital, £1,000. Objects: To carry on the business of manufacturers of, agents for and dealers in radio and television sets and apparatus, artificial lighting apparatus, electrical fittings, &c. The directors are: G. H. Bennett, 15, New House Lane, Gravesend; and N. F. Shuttlewood, 74, Central Avenue, Gravesend.

Wilkerson Rotary Engine, Ltd.—Private company. Registered November 1st. Capital, £12,000. Objects: To acquire and turn to account patents, licences, concessions, and the like; to carry on the business of mechanical and electrical engineers, machinists, fitters, millwrights, founders, metallurgists, &c.; and to adopt an agreement between J. S. Wilkerson and W. Quilter of the first part, the company of the second part, Industrial Options, Ltd., of the third, and A. Butterworth of the fourth part. The directors are: C. A. de Bernales, 8, Great Winchester Street, E.C.2: J. S. Wilkerson, 49, Cheyne Avenue, Snaresbrook, E.18; and W. Quilter, 55, Ravenscraig Road, New Southgate, N.11. Solicitors: Richardson, Sowerby, Holden & Co., 5, John Street, Bedford Row, W.C.1.

Franks & Co. (Radio), Ltd.—Private company. Registered November 7th. Capital, £100. Objects: To carry on the business of electricians, radio and electrical engineers, &c. The subscribers are: H. Piercy and J. Elman, of 271-3, Oxford Street, W. Secretary: H. Piercy.

Jack Heath (Radio), Ltd.—Private company. Registered November 8. Capital, £500. Objects: To acquire the business of electrical and wireless engineers carried on by J. W. Heath and F. E. Hunt at 28, Bournville Lane, Stirchley, Birmingham. The directors are: J. W. Heath, 28, Bournville Lane, Stirchley, Birmingham, and F. E. Hunt, 10, Eastern Road, Selly Park, Birmingham, 29. Solicitor: T. Adams, 117, Colmore Row, Birmingham.

Norman A. Hough, Ltd.—Private company. Registered November 4th. Capital, £100. Objects: To acquire the business of an electrical engineer and contractor carried on by N. A. Hough at 49, Kingsway, Manchester, 19, as Norman Hough. The directors are: N. A. Hough and Mrs. M. M. Hough, both of 8, Burnside Drive, Levenshulme, Manchester, 19.

Returns of Electrical Companies

Statements of Capital

Anglo-Argentine Tramways Co., Ltd.—Capital, £11,000,000 in 800,000 first preferred and 710,000 second preferred shares of £5 and 862,500 ordinary shares of £4. Return dated August 9th, 1938. 640,000 first preferred, 610,000 second preferred and 675,000 ordinary shares taken up. £850,000 paid. £8,100,000 considered as paid. Mortgages and charges, £70,660 annuity, £4,465,674 first debenture stock, £1,733,380 second debenture stock, and £6,000,000 income debenture stock.

Kalgoorlie Electric Tramways, Ltd.—Capital, £250,000 in £1 shares. Return dated August 3rd, 1938. All shares taken up. £250,000 paid. Mortgages and charges, £68,750.

Nigerian Electricity Supply Corporation, Ltd.—Capital, £500,000 in 450,000 preferred ordinary shares of £1 and 200,000 ordinary shares of 5s. each. Return dated August 10th, 1938. All shares taken up. £450,076 15s. paid on 450,000 preferred ordinary and 307 ordinary shares. £49,923 5s. considered as paid on 199,693 ordinary shares. Mortgages and charges, £191,127.

Watliff Co., Ltd.—Capital, £15,000 in 3,000 ordinary, 7,000 7½ per cent. preference and 5,000 6 per cent. preference shares, all of £1. Return dated October 19th, 1938. All shares taken up. £14,880 paid on 2,880 ordinary and all the preference shares. £120 considered as paid on 120 ordinary shares. Mortgages and charges, £4,500.

New System Private Telephones, Ltd.—Capital, £20,000 in £1 shares. Return dated June 14th, 1938. All shares taken up. £33,000 paid on 13,000 shares (including premium of £3 per share on 5,000 shares). £2,000 considered as paid on 2,000 shares. Mortgages and charges, nil.

Bambairtite Battery Co., Ltd.—Capital, £2,000 in £1 shares. Return dated September 30th, 1938. 1,146 shares taken up. £146 paid. £1,000 considered as paid. Mortgages and charges, nil.

Concordia Electric Wire Co., Ltd.—Capital, £100,000 in £1 shares. Return dated July 14th, 1938. 57,319 shares taken up. £57,319 paid. Mortgages and charges, £8,000.

Mortgages and Charges

J. M. Vaughan, Ltd.—Charge on 7, 8 and 9, Triangle South, Clifton, Bristol, dated October 25th, 1938, to secure £500. Holder: J. M. Vaughan, "The Gables," Park Road, Keynsham, Somerset.

Kniveton Cable Works, Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated October 13th, 1938, to secure £35,000. Holders: Ismay Industries, Ltd., Ismay House, 104-5, Newgate Street, E.C.1.

Safeguard Electrical Appliances (Dewsbury), Ltd.—Particulars filed of £1,500 debentures, authorised October 4th, 1938, charged on the company's undertaking and property, present and future, including uncalled capital, the whole amount being now issued and ranking *pari passu* with debentures previously issued.

Hume Atkins & Co., Ltd.—Mortgage on leasehold lands and factory in Icknield Way, Letchworth, Herts, with fixtures, &c., dated October 6th, 1938, to secure all moneys due or to become due from the company to Midland Bank, Ltd.

Increases of Capital

Weston-super-Mare and District Electric Supply Co., Ltd.—The nominal capital has been increased by the addition of £35,000 in £1 ordinary shares, beyond the registered capital of £180,000. To May 27th, 1938, 40,000 preference and 140,000 ordinary shares had been issued and fully paid up, of which the B.E.T. Electricity Supply Co., Ltd., held 27,940 preference and 127,585 ordinary shares and Brush Electrical Engineering Co., Ltd., held 1,350 ordinary shares. A further 35,000 ordinary shares were allotted for cash on October 11th, 1938, the two above-named companies being allotted 31,896 and 337 shares respectively.

Lewes & District Electric Supply Co., Ltd.—The nominal capital has been increased by the addition of £10,000 in £1 ordinary shares, beyond the registered capital of £60,000. To May 27th, 1938, 57,500 shares had been issued and paid up, of which B.E.T. Electricity Supply Co., Ltd., held 55,910 shares, and Brush Electrical Engineering Co., Ltd., held 1,150 shares. A further 11,500 shares were allotted as bonus on October 11th, 1938, of which the two above-named companies held 11,270 and 230 shares respectively.

Sheerness and District Electric Supply Co., Ltd.—The nominal capital has been increased by the addition of £10,000 beyond the registered capital of £100,000. The additional capital is divided into 10,000 unclassified shares of £1. At May 27th, 1938, B.E.T. Electricity Supply Co., Ltd., held 94,670 shares out of 100,000 issued.

Corbelux, Ltd.—The nominal capital has been increased by the addition of £9,500 beyond the registered capital of £500.

The additional capital is divided into 4,500 ordinary and 5.000 preference shares of £1 each.

Perak River Hydro-Electric Power Co., Ltd.—The nominal capital has been increased by the addition of £500,000 in £1 "A" shares beyond the registered capital of £3,000,000.

Reports and Dividends

The North Metropolitan Power Station Co.—Baring Bros. & Co. have purchased at 96 per cent. £1,000,000 3½ per cent. second mortgage debenture stock series "B," 1965. The stock, the security for which is identical with that for the existing 5 per cent. and 3½ per cent. second mortgage debenture stocks, is being issued to provide funds for the extension of one of the company's power stations at Brimsdown, and for the installation of plant.

The Barbados Electric Supply Corporation, Ltd., reports a net profit for the year ended June 30th of £11,960, as compared with £11,176, in the preceding year, to which is added £2,654 brought in. Reserve receives £3,600 and the dividend for the year is maintained at 6 per cent., tax free. The balance carried forward is £2,714.

Dictograph Telephones, Ltd., reports a net trading profit for the year ended August 31st of £30,551, as compared with £28,634 in the preceding year, to which is added £3,055 brought in, making £33,606. After providing for taxation and N.D.C. it is proposed to pay a dividend for the year of 10 per cent., less tax (against 7½ per cent.), to place £2,500 to taxation reserve, £2,500 to general reserve, and to carry forward £4,468.

The Salisbury Electric Light & Power Co., Ltd., has cancelled the meeting it had called to approve the sale of the undertaking to the Wessex Electricity Co. The *Financial Times* states that a circular announces that the Wessex Co., having been in consultation with the Electricity Commissioners and the Salisbury Corporation, has decided to withdraw its offer.

The International Nickel Co. of Canada, Ltd., reports a net profit for the third quarter of 1938 of $7,552,123, equivalent to 48 cents per share on the common stock after allowing for preferred dividend. This compares with a net profit of $6,618,486 for the previous quarter, which was equal to 42 cents per share on the common stock. The net profit for the first nine months was $24,284.374, as compared with $38.944,380 for the similar period of 1937, or $1.56 per share as against $2.57 a year ago.

The Associated Equipment Co., Ltd., has announced a final dividend of 1s. per £1 unit of stock, tax free, making 1s. 6d. per unit, tax free, or 7½ per cent. (same).

The Wessex Electricity Co., Ltd., has applied to the Electricity Commissioners for powers to raise additional capital by the creation of shares on stock.

Edmundsons Electricity Corporation, Ltd., announces that the results of the operations of its group of companies during October, as compared with the corresponding month of 1937, show an increase of 14 per cent. in kWh sold.

The Cawnpore Electricity Supply Co., Ltd., is maintaining its interim dividend at 3 per cent.

Franco Signs, Ltd., is paying an interim dividend of 4 per cent., actual, less tax (same).

Stocks and Shares

TUESDAY EVENING.

STOCK Exchange markets have been overcast by a fresh cloud of foreign political disturbance, which, this time, takes the shape of bitter persecution of the Jews in Germany. The effect is felt in practically all the markets, and though it must be in the main psychological, it exercises, nevertheless, a very practical influence over prices. Gilt-edged stocks have weakened as a consequence of this persecution, and also by reason of the falling away of the value of the pound sterling as compared with the dollar.

The result of last week's American elections, which showed President Roosevelt to be losing some of his grip upon party popularity, was to put up prices of American stocks and shares as soon as the figures became known, but the advance has not been held in its entirety. Some people declare that Jewish holders of stock have been selling in order to meet the penalties laid upon them. This sounds very improbable; a more likely cause for the reaction is that previous buyers came in to take the good profits offered them by the post-Election quotations.

Electricity Supply Issues

Fresh issues of debenture stocks have been placed by the Metropolitan Electric, and North Metropolitan Power Station Companies. The new Metropolitan 3 per cent. stock, of which £750,000 was placed, is available in the market at 87, free of stamp, to yield £3 9s. per cent. on the money. Allowing for redemption, which will take place between 1941 and 1970, the return works out at £3 14s. 6d. per cent. North Metropolitan Power Station 3½ per cent. second debentures, redeemable in 1965, came to market at the beginning of this week, the offered price being 98½ and the running yield £3 11s. 3d. per cent. Dealings are subject to the granting of permission to deal. Comparison between the two yields and those on Government stocks indicates that the security of the electrical issues is considered to be as nearly gilt-edged as an industrial issue can be. Electrical Finance & Securities are proposing an increase of capital, and an offer of ordinary shares to the members: the terms have not yet been announced. At 50s., the present shares give the comparatively generous return of 5 per cent. on the 12½ per cent. distributions which have been made for many years.

Electricity in the Air

Last week's speech by the Air Minister drew attention to the part played by electrical manufacturing firms in the Air Force expansion. Associated Electrical Industries and English Electric were mentioned by name as engineering companies which work closely with the aircraft industry. The A.E.I. company has a connection through the subsidiary Metropolitan-Vickers. Now the firm is to join John Brown in the control of Westland Aircraft. The aircraft company, incidentally, took over the Petters factories at the time when Brush Engineering acquired the plant and the business. English Electric is said to work in with Handley Page. Presumably there are similar understandings between other electrical and aircraft companies. Evidently the intention is to encourage these aids to the smooth and rapid running of the air defence scheme. Consideration of the advantages from a useful volume of this kind of work has doubtless had a bearing on the firmness of shares in the companies concerned. Associated Electrical Industries at 39s. are 1s. 6d. up and English Electrics at 32s. show a gain of 6d.

British Electric Resistance

Dealings have begun at about 3s. 6d. in the 2s. ordinary shares of British Electric Resistance. Particulars of the business were published last week as a necessary preliminary to the introduction of the shares into the Stock Exchange market. They showed the company to specialise in the production of transformers, resistances and other electrical equipment. Profits have been more than trebled over the past five years, and were equal last year to about 26 per cent. on the issued capital. A dividend was paid for the half year to July at the rate of 20 per cent.

A Month's Movements

There has been nothing half-hearted about the past month's recovery of many share prices in the more popular parts of the industrial markets. Some of the best performers have been among the electrical and general engineering shares, as this table shows:

Share.	Price Oct. 18th.	Price Nov. 15th.	Rise on Month.
British Aluminium	50/–	55/–	5/–
British Thermostat	11/3	16/3	5/–
Consolidated Signal	4½	5	10/–
English Electric...	29/6	32/–	2/6
Ever Ready	19/–	21/6	2/6
General Electric	76/–	78/–	2/–
Greenwood & Batley	22/6	27/6	5/–
International Combustion	5	5½	10/–
J. Lucas	55/–	57/6	2/6
Lancashire Dynamo	55/–	67/6	12/6
Mather & Platt	44/6	47/–	2/6
Murex	72/6	80/–	7/6
Vickers	21/6	24/6	3/–
Westinghouse Brake	52/6	59/6	7/–

Few of the shares, it may be noted, lack the attraction of an interest in rearmament work. Aggressive is not the word to describe the buying which has lifted prices so appreciably. It has been as much a case of reluctance to sell as of pressure to buy. At the same time, the demand has been determined enough not to object to paying prices which look stiff by comparison with those of a month or so back.

American Affairs

Wall Street regards the New Deal as poison to the confidence of private enterprise, and, consequently, to the growth of business activity. Results of last week's mid-term elections in the United States were celebrated by the market as a severe rebuff to the President's plans. Opposition to the New Deal is now felt to be strong enough to put a spoke in Mr. Roosevelt's wheel. It is thought that the Republican representatives will be able to combine with the conservative elements in the President's own party to protect the business community against the passing of extreme measures. Hopes are running, therefore, upon a lasting revival of confidence in private business that will take the place of present Government prodigality and become established as the mainspring of a new spell of prosperity. Utility and railroad stocks joined the industrial sections in an upswing which took prices to the year's highest points. From these levels, as already noted, reaction occurred in sympathy with European politics and in consequence of local profit taking.

Miscellaneous Matters

Cable and Wireless issues are among the stocks which are quick to reflect American tendencies. Brisk business in Wall Street usually means a livelier flow of transatlantic communications: the healthy growth of American industries leads in the direction of more animated trade round the globe. The combine's ordinary stock is 10s. better, at 42½, the preference remains unchanged. The home railway market opened the week with a more cheerful air. It seemed that the companies' recent reminder of present difficulties had a bracing effect, which was reinforced by the encouraging character of the last traffic figures. Better activity in the heavy industries, and a possible upward revision of fares, are two matters insisted upon by the optimists. Southern preferred, with a rise of 3 points to 57½, was in the van of the advance. Later the price came back to 57 on the spasm of uneasiness which chilled enthusiasm in most of the markets. Dullness in the market for rubber shares reflected misgivings over the policy of relaxing the restriction on production of the commodity.

Electrical Companies' Shares

Prices, dividends and yields

Company.	1938. High-est.	1938. Low-est.	Dividend. Pre-vious.	Dividend. Last.	Price Nov. 15.	Rise or Fall.	Yield p.c. £ s. d.
Home Electricity Companies.							
Bournemouth and Poole ...	68/3	62/–	15	15	67/6	—	4 8 7
British Power & Light ...	30/9	24/6	6	7	28/6	—	4 18 3
City of London	34/6	28/6	7½	7½	31/6	—	4 15 3
Clyde Valley	42/6	33/–	8	8	36/3	+6d.	4 8 2
County of London Edmundson's:	51/9	38/9	10½	10½	47/–	+6d.	4 9 5
7% Pref....	33/3	30/–	7	7	31/3	—	4 9 6
Ord.	40/9	18/9	9	9	26/–	—	—
Elec. Dis. Yorkshire ...	43/6	37/9	9	9	41/3	—	4 7 5
Elec. Fin. and Securities ...	51/9	49/–	12½	12½	50/–	—	5 0 0
Elec. Supply Corporation...	55/–	50/–	12	12	53/9	—	4 9 5
Isle of Thanet	21/3	18/6	4	4	20/–	—	4 0 0
Lancs Light and Power ...	35/–	26/–	7½	7½	31/3	—	4 16 0
Llanelly Elec.	23/6	21/–	5½	5½	21/6	—	5 2 4
Lond. Assoc. Electric ...	32/9	28/–	7	7	30/9	—	4 11 4
London Electric	36/3	32/–	8	10	34/–	—	4 2 4
London Power Deb. Red.	108¾	100	5	5	105	—	4 15 3
Metropolitan	51/–	41/–	10	12	48/3	+9d.	4 19 7
Midland Counties	39/9	33/–	8	8	36/3	—	4 4 3
Mid. Elec. Power	41/9	37/–	8	9	40/–	—	4 10 0
Newcastle Elec.	31/9	27/6	7	7	28/9	—	4 17 4
North Eastern Electric:							
Ordinary...	34/–	25/–	7	7	31/–	—	4 10 6
7% Pref....	34/–	30/–	7	7	32/–	—	4 7 6
Northampton	47/6	43/9	10	10	46/3	—	4 6 7
Notting Hill 6% Pref. (£10)	14	13⅛	6	6	14½	—	4 2 9
North Met. Elec.:							
Ordinary...	49/–	43/–	10	10	46/3	—	4 6 7
6% Pref....	30/6	28/3	6	6	29/6	—	4 1 4
Richmond Elec.	30/6	28/–	7	7	28/9	—	4 17 5
Scottish Power	38/9	32/–	8	8	36/3	—	4 8 2
Southern Areas	22/9	18/6	4½	5	21/3	—	4 14 1
South London	32/6	31/–	7	7	31/6	—	4 9 0
West Devon	23/3	21/3	5	5	1⅛	—	4 9 0
West Glos....	19/–	16/9	2	2	19/–	+1/–	2 2 1
Yorkshire Elec.	42/–	36/9	8	8	40/–	—	4 0 0
Overseas Electricity Companies.							
Atlas Elec.	4/6	2/6	Nil	Nil	3/–	—	—
Calcutta Elec.	44/3	36/3	12*	10*	2	—	5 0 0
Cawnpore Elec.	40/–	35/–	10	10	36/3	—	5 10 6
East African Power ...	28/3	22/6	7	7	23/6	—6d.	5 19 2
Jerusalem Elec.	26/9	23/3	5	6	24/–	—	5 0 0
Kalgoorlie (10/–)	12/–	9/6	7½	7½	10/3	—	7 6 4
Madras	34/6	28/9	8*	8*	30/–	—	5 6 8
Montreal Power	31¾	26¾	1½	1½	32	+1	—
Palestine Elec. "A" ...	31/9	27/–	7½*	7½*	30/–	–9d.	5 0 0
Perak Hydro-electric ...	25/3	17/–	7	6	19/6	–6d.	6 3 1
Shawinigan Power ...	23½	16½	65cts.	85cts.	22	+½	—
Tokyo Elec. 6%	65½	39	6	6	60	--	10 0 0
Victoria Falls Power ...	76/3	55/–	12	13½	70/–	—	3 17 2
Whitehall Investments Pref.	22/3	15/–	7½	7½	17/6	—	8 11 6
Public Boards.							
Central Electricity:							
1950–70	115⅝	97	5	5	110½	—	4 10 6
1955–75	118½	100	5	5	113½	—	4 8 1
1951–73	111	95	4½	4½	108½	—	4 3 0
1963–93	101	85	3½	3½	96½	—	3 11 10
London Elec. Trans. Gtd.	93½	88	2½	2½	90½	—	2 15 3
London & Home Counties, 1955–75	112⅝	97½	4½	4½	110	—	4 1 10
Lond. Passenger Transport:							
A	119½	110	4½	4½	113½	–1	3 19 4
B	122⅝	105	5	5	115½	—	4 6 7
C	84	68	4½	4	75	–½	5 6 0
West Midlands Joint Elec., 1948–68	115½	102½	5	5	113	+2	4 8 6
Telegraph and Telephone.							
American Tel. & Tel. ...	154½	114	9	9	157½	+2	5 14 4
Anglo-Am. Tel.:							
Pref.	115½	103	6	6	101½	—	5 17 8
Def.	28	24	1½	1½	23	—	6 10 5
Anglo-Portuguese	23/6	19/3	8	8	21/3	—	7 10 7
Cable & Wireless:							
5½% Pref.	104	84	4½	5½	87½	—	6 5 9
Ord.	67½	36	—	4	42½	+½	9 8 6
Income	102½	99	—	—	101	—	3 18 2
Canadian Marconi $1 ...	6/6	3/9	—	Nil	5/3	—	—
Globe Tel. & Tel.:							
Ord.	32/6	27/6	5½*	7½*	27/6	+⅛	5 9 1
Pref.	27/6	23/9	6	6	26/3	—	4 11 5
Great Northern Tel. (£10)...	42½	34/–	20	20	40	–1	5 0 0
Marconi-Marine	30/6	21/6	10	7½	23/9	—	6 6 4
Oriental Telephone Ord. ...	59/3	2½	12*	12*	2⅜	—	4 7 3
Radio Corpn.	8	4⅜	8	6	8⅞	–⅜	—
Telephone Props	13/9	11/3	5	6	13/3	—	9 1 2
Telephone Rentals (5/–) ...	10/–	7/6	5	6	9/3	—	3 4 10
Western Union	34½	17	2⅜	—	20½	—	—
Traction and Transport.							
Anglo-Arg. Trams:							
First Pref.	11/–	2/6	Nil	Nil	5/–	—	—
4% Inc.	31	8	Nil	Nil	9	—	—
British Electric Traction:							
Def. Ord.	1060	675	5	5	950	—	—
Pref. Ord.	175	150	8	8	165	—	4 17 0
Bristol Trams	45/–	34/3	5	8	2⅛	+⅛	3 17 7
Brazil Traction	14½	7½	70cts.	$1	12¼	–¼	—
Calcutta Trams	26/9	21/6	8	8	23/6	—	6 16 2
Cape Elec. Trams	18/6	15/6	5	6	17/6	—	6 17 2
Lancs Transport	35/3	29/3	10	10	35/–	—	5 14 3
Mexican Light: 1st Bonds	39	16½	5	5	25	—	—
Rio 5% Bonds	91	47	5	5	63	–2	7 18 9
Southern Rly:							
5% Prefd.	87	48	5	—	57	+2½	—
5% Pref.... ...	116	83	5	5	95½	–1	5 4 10
T. Tilling	60/–	36/6	10	10	45/–	—	4 9 0
Tilling & B.A.	57/–	46/–	6	10	50/–	—	4 0 0
West Riding	46/3	30/6	10	10	32/6	—	—
Equipment and Manufacturing.							
Aron Electricity Ord. ...	40/3	31/–	15	15	1¼	—	8 17 6
Assoc. Elec.:							
Ord.	45/3	32/–	10	10	39/–	+1 6	5 2 8
Pref.	38/9	35/6	8	8	36/6	—	4 7 8
Automatic Telephone & El.	43/–	35/–	5	10	41/3	—	4 17 1
Babcock & Wilcox ...	44/–	32/6	10	10	37/6	—	5 6 8
British Aluminium Ord. ...	54/–	40/–	10	12½	55/–	+⅛	4 11 0
British Insulated Ord. ...	95/9	77/–	20	20	4⅞	—	4 10 0
British Thermostat (5/–)...	15/6	9/–	17½	18½	16/3	+⅛	5 13 10
British Vacuum Cleaner ...	35/9	27/6	5	6	28/3	—	4 5 0
Brush Ord.	5/6	4/9	Nil	Nil	4/9	—	—
Callender's	5½	78/6	20	20	4⅝	—	4 15 8
Chloride Elec. Storage ...	77/9	61/–	15	20	77/6	+¼	5 3 1
Consolidated Signal ...	116/–	75/–	30	36½	5	+½	7 6 0
Crabtree (10/–)	29/–	22/–	17½	17½	25/–	—	7 0 0
Crompton Parkinson: Ord. (5/–)	32/3	18/9	12½	12½	27/6	+⅛	—
E. K. Cole (5/–)	8/9	4/6	5	10	6/6	—	7 13 10
Elec. & Musical Industries (10/–)	16/3	9/–	10	5	11/6	+3d.	4 7 0
Electric Construction ...	36/–	31/–	10	12½	32/6	—	7 13 10
Enfield Cable Ord. ...	5⅝	46/–	25	25	2½	—	—
Electrical Switchgear ...	26/3	22/6	5	5½	26/3	—	4 3 10
English Electric	31/9	24/6	Nil	10	32/–	+6d.	6 5 0
Ensign Lamps (5/–) ...	14/3	11/3	—	25	14/0	—	8 18 6
Ericsson Tel.	2⅛	31/–	25*	25*	2⅛	+⅛	3 0 6
Ever Ready (5/–)	26/3	16/6	45	35	21/6	—	8 2 10
Falk Stadelmann	34/3	27/–	10	10	27/6	—	7 5 6
Ferranti Pref.	27/6	25/6	7	7	27/6	—	5 2 0
G.E.C.: Pref.	34/–	31/3	6½	6½	32/6	—	4 0 0
Ord.	79/3	67/–	17½	20	78/–	+1/–	5 2 7
Greenwood & Batley ...	25/6	19/–	7	15	27/6	+⅛	10 19 0
Hall Telephone (10/–) ...	24/6	18/3	5	15	20/–	—	7 10 0
Henley's (5/–)	21/–	16/–	15	20	20/–	—	5 0 0
4½% Pref.	23/–	22/–	4½	4½	22/6	—	4 0 0
Hopkinsons	40/–	32/6	10	12½	40/–	+6d.	6 5 0
India-Rubber Pref. ...	21/9	20/3	5½	5½	21/3	—	5 3 6
Intl. Combustion	5⅝	4½	5	30	5½	+½	5 9 0
Ismay Industries (5/–) ...	6/9	1/3	6	6	1/–	—	—
J. Lucas	57/9	47/6	15	15	57/6	—	5 4 4
Johnson & Phillips ...	43/9	32/6	10	12½	36/3	—	6 13 4
Lancashire Dynamo ...	72/3	53/–	20	25	67/6	+⅜	7 8 10
Laurence Scott (5/–) ...	12/–	9/–	7	15	12/–	+9d.	6 5 0
London Elec. Wire ...	35/–	28/3	12	7½	29/6	+9d.	5 1 8
Mather & Platt	49/–	41/3	12	13½	47/–	—	5 15 0
Metropolitan Elec. Cable Pf.	22/–	21/–	5½	5½	21/3	—	5 3 6
Murex	93/9	66/3	20	20	80/–	+½	5 0 0
Pye Deferred (5/–) ...	12/–	8/–	5	25	9/6	—	13 3 2
Revo (10/–)	36/3	30/–	12	17½	35/–	—	5 0 0
Reyrolle	62/6	49/–	12½	12½	56/3	—	4 9 0
Siemens Ord.	31/–	20/6	7½	7½	23/9	—	6 6 4
Strand Elec. (5/–) ...	6/–	4/–	5	10	5/–	—	10 0 0
S. Smith (1/–)	9/9	6/3	37½	50	8/9	—	6 6 0
Switchgear & Cowans (5/–)	19/6	12/6	20	20	14/6	—	6 18 0
Telegraph Condenser (10/–)	18/9	12/–	5	5	12/6	—	4 0 0
Telegraph Construction ...	2½	36/–	7½	10	2¼	—	4 14 1
Telephone Mfg. (5/–) ...	9/9	7/–	9	9	8/9	—	5 2 10
Tube Investments... ...	89/6	70/–	23¾	23¾	4½	—	5 15 6
Vactric (5/–)	9/9	5/9	10	10	5/–	—	10 0 0
Vickers	27/–	17/6	10	10	24/6	—	4 1 9
Westinghouse Brake ...	63/9	45/–	15	17½	59/6	+3/6	5 17 5
Walsall Conduits (4/–) ...	26/–	22/6	—	55	24/9	+9d.	8 19 0
West, Allen (5/–)	5/9	4/6	—	7½	6/–	+3d.	6 5 0

* Dividends are paid free of Income Tax.

New Patents

Electrical specifications recently published

Compiled by a firm of chartered patent agents. The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1937

1326. "Protection of magnesium-rich alloys against corrosion by electrolytic methods." H. Sutton, L. F. Le Brocq and E. G. Savage. January 16th, 1937. (493935.)

1471. "Methods of and arrangements for producing television images with persistent light impression." Radioakt. Ges. D. S. Loewe. January 21st, 1936. (Cognate applications 1472/37, 1473/37, 1474/37 and 1475/37.) (494145.)

7594. "Producing steel alloys for permanent magnets." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. March 17th, 1936. (493940.)

7726. "Electric lamps." C. O. Lockey. March 16th, 1937. (493944.)

10935. "Electric cable systems." Okonite-Callender Cable Co., Inc. April 22nd, 1936. (494095.)

10965. "Magnetically operated electric switches." A. Cianchi. April 16th, 1937. (494155.)

11125. "Telegraph systems." Standard Telephones and Cables, Ltd., and V. J. Terry. April 19th, 1937. (Cognate application 18437/37.) (494099.)

11126. "Telephone transmitters." Standard Telephones and Cables, Ltd., L. C. Pocock and H. S. Leman. April 19th, 1937. (494293.)

11128. "Thermionic valves." Standard Telephones and Cables, Ltd., and D. H. Black. April 19th, 1937. (494100.)

11178. "Grading of electric resistances and articles comprising the same." D. G. Ashcroft, W. Taylor, and Imperial Chemical Industries, Ltd. April 19th, 1937. (494103.)

11233. "Inertialess switches." Fernseh Akt.-Ges. April 20th, 1936. (494164.)

11258. "Electrical musical instruments." L. Hammond. April 24th, 1936. (494165.)

11272. "Cathode-ray tubes." Radio Akt.-Ges. D. S. Loewe. April 22nd, 1936. (494298.)

11279. "Electric relay apparatus." R. C. Graseby. April 20th, 1937. (494166.)

11296. "Fluorescent materials and methods of manufacturing the same." British Thomson-Houston Co., Ltd. April 22nd, 1936. (494299.)

11289. "Luminescent screens." British Thomson-Houston Co., Ltd., W. J. Scott and J. T. Anderson. April 20th, 1937. (494105.)

11306. "Electron-discharge device oscillators." Telefunken Ges. für Drahtlose Telegraphie. April 20th, 1936. (494230.)

11423. "Means for mounting indicating instruments on switchboards or panels." H. Lister and Metropolitan-Vickers Electrical Co., Ltd. April 21st, 1937. (494017.)

11441. "Small electric motors." K. Gettwart. April 21st, 1936. (Cognate application 11442/37.) (494018.)

11445. "Electrical signalling or control systems." Automatic Telephone & Electric Co., Ltd., and W. A. Harrison. April 21st, 1937. (494235.)

11616. "Multipole automatic switches." J. A. Crabtree & Co. (Schiele Industriewerke). April 23rd, 1937. (494021.)

11639. "Thermal cut-outs for electrically heated apparatus." Revo Electric Co., Ltd., and F. H. Reeves. April 23rd, 1937. (493953.)

11679. "Photo-electric image-convertors." J. Kessler. April 23rd, 1937. (494310.)

11689. "Television and like receivers." Fernseh Akt.-Ges. April 23rd, 1936. (494254.)

11735. "Radio direction-finding installations." Marconi's Wireless Telegraph Co., Ltd., and S. W. H. W. Falloon. April 23rd, 1937. (494263.)

12459. "Electro-magnetic switches." J. A. Crabtree & Co., Ltd. (Schiele Industriewerke). May 1st, 1937. (493957.)

12846. "Mercury switches." General Electric Co., Ltd., H. C. Turner and E. Engel. May 5th, 1937. (494180.)

12911. "Tone correction in low-frequency thermionic amplifiers of radio receivers." E. K. Cole, Ltd., and A. E. Falkus. May 6th, 1937. (494024.)

13160. "Fluxes and flux-coated electrodes for electric welding." T. C. R. Shepherd and Metropolitan-Vickers Electrical Co., Ltd. May 7th, 1937. (494181.)

13287. "Automatic tuning systems for wireless receiving apparatus." General Electric Co., Ltd., W. H. Peters, S. G. Hunter and A. A. Chubb. May 10th, 1937. (Cognate application 14070/37.) (494026.)

13298. "Electron-discharge device oscillators." Telefunken Ges. für Drahtlose Telegraphie. May 9th, 1936. (Addition to 494230.) (494273.)

13608. "Protective means for the holding coils of automatic electric switches." J. A. Crabtree & Co., Ltd. (Schiele Industriewerke). May 14th, 1937. (494028.)

16057. "Electric switches and circuit-breakers." N. R. Davis and Sun-Vic Controls, Ltd. June 9th, 1937. (494185.)

18192. "Electric insulating compositions." British Thomson-Houston Co., Ltd. July 1st, 1936. (493961.)

18656. "Signal receiving systems." A. H. Stevens (Western Union Telegraph Co.) July 5th, 1937. (493963.)

19379. "Magnetic cores for electrical measuring instruments." English Electric Co., Ltd., and G. Tilstone. July 13th, 1937. (494191.)

19397. "High-pressure metal vapour electric-discharge lamps." General Electric Co., Ltd. (Patent-Treuhand Ges für Elektrische Glühlampen). July 13th, 1937. (494192.)

19540. "Electric oscillators." Standard Telephones & Cables, Ltd. September 2nd, 1936. (493966.)

19769. "Lamps adapted to emit ultra-violet radiation accompanied by substantially no visible light." General Electric Co., Ltd. (Patent Treuhand Ges für Elektrische Glühlampen). July 16th, 1937. (494128.)

20343. "Electron multipliers." Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz. August 28th, 1936. (493968.)

21240. "Fluid-blast electric switches." Brown Boveri & Cie Akt.-Ges. July 30th, 1936. (494044.)

21436. "Animated electric-discharge lamps." J. J. Minson. August 5th, 1936. (Cognate application 21437/37.) (494045.)

21835. "Devices for protecting electrical transformers and other apparatus." K. F. Buchholz. August 8th, 1936. (494197.)

23996. "Apparatus for the photo-electric reproduction of sound films." O. K. Kolb. September 2nd, 1937. (494201.)

26056. "Supply installations for electric-discharge lamps." British Thomson-Houston Co., Ltd. September 25th, 1936. (493975.)

26947. "Electrically heated liquid heaters, such as sterilisers." American Sundries Co., Inc. April 23rd, 1937. (494284.)

29390. "Secondary emission electron multipliers." General Electric Co., Ltd., W. H. Aldous and L. R. G. Treloar. October 27th, 1937. (494208.)

30382. "Electric wave-filter systems." C. Lorenz Akt.-Ges. November 6th, 1936. (493982.)

35864. "Electric fuses." V. Hope. December 28th, 1937. (493988.)

1938

746. "Braking devices for the switching on movements of electro-magnetically actuated switches." British Thomson-Houston Co., Ltd. January 11th, 1937. (494063.)

1010. "Electric generating plant." R. A. Lister and Co., Ltd., and M. W. Wilson. January 12th, 1938. (494064.)

1213. "Devices for the production of electrostatic fields for curative purposes." J. Jones. May 5th, 1937. (493990.)

4240. "Device comprising a liquid-cooled high-pressure vapour discharge tube." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. February 13th, 1937. (494068.)

11816. "Mercury or other conducting-liquid switches." A. Cianchi. April 16th, 1937 (Divided out of 494155). (Addition to 453229.) (494289.)

12326. "Electrical continuity testing devices." General Electric Co., Ltd., and E. S. Whillans. April 25th, 1938. (494080.)

21093. "Journalling of shafts in electrical apparatus." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. July 16th, 1937. (494084.)

27814. "Luminescent screens." British Thomson-Houston Co., Ltd., W. J. Scott and J. T. Anderson. April 20th, 1937 (Divided out of 494105.) (494290.)

Trade Mark Applications

THE following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from November 9th:—

Aysynn. No. 586751. Class 8 (III). Philosophical and scientific instruments and apparatus for useful purposes.—S. Smith & Sons (Motor Accessories), Ltd., Cricklewood Works, Edgware Road, Cricklewood, N.W.2.

Ferranti Car Radio (lettering and design). No. 586912. Class 8 (III). Radio receiving apparatus for use in motor cars.—Ferranti, Ltd., Wickentree Lane, Hollinwood, Lancashire.

Asthmator. No. 585183. Class 11 (III). Electrically and hand-operated inhalers (not medicated). Francis Riddell, Ltd., Axtell House, Warwick Street, Regent Street, W.1.

Little Briton. No. 585914 (lettering only); No. 585916 (lettering and design). Class 50 (III). Parts of electric switches combined switch and plug and socket couplings, plug and socket couplings, bell pushes and switch blocks, all made from phenol formaldehyde, condensation products or from thermo-setting or thermoplastic moulding materials having a basis of natural or synthetic resin cellulose derivatives, cellulose acetate, celluloid, casein, bitumen, polymerised vinyl ester or other alkyl ester of acrylic acid or its homologues, or of fibre, switch blocks of wood, &c. C. H. Parsons, Ltd., Britannia Works, Wharfdale Road, Tyseley, Birmingham.

Electrolux (similar lettering in two designs). Nos. 600747/8. Class 1 (IV). Water softening materials of the base exchange type. Nos. 600068 and 600072. Class 7 (IV). Air compressors, air-purifying machines, polishing, washing and wax-polishing machines, electric motors and spraying machines. Nos. 600067 and 600071. Class 9 (IV). Dust blowers (electric), vacuum dust extractors (electric), dust-removing apparatus (electric), and electric vacuum cleaning apparatus. Nos. 600066 and 600070. Class 11 (IV). Electric fans, air-purifying and deodorising apparatus, refrigerating plant, &c.—Electrolux, Ltd., Electrolux Works, Oakley Road, Luton.

Platalux. No. 600207. Class 11 (IV). Electric lamps (ordinary).—Alexander Brünner, 29, Inverness Terrace, W.2.

Japanese Development in North China

A *Reuter* message from Tokyo reports the formation of a new company with a capital of 350,000,000 yen (about £20,588,000) for the development of Japanese-controlled North China. The company, which will be known as the North China Development Co., will control all key industries, these being conducted by subsidiary concerns. The North China Telegraph & Telephone Co. has already been formed to operate telegraph and telephone services. The existing China Development Co., a joint Sino-Japanese concern, will be dissolved. New subsidiary companies will be organised, including the North China Electric Co., with a capital of 100,000,000 yen (£5,882,000).

Contract Information

Particulars of work for which tenders are invited, contracts placed, and building schemes promising work for electrical contractors and traders

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses. Further details of items marked with an asterisk can be obtained from the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, London, S.W.1.

Argentina.—BUENOS AIRES.—November 21st. National Sanitation Works Department. 1,340 electricity meters. (T.Y. 27794/38.)*

Australia.—MELBOURNE.—December 6th. Posts and Telegraphs Department. Enamel insulated, braided cable. (T. 28566/38.)*

GLADSTONE.—November 23rd. Electricity Authority. One 200-kVA and one 100-kVA alternator. (T. 28027/38.)*

BRISBANE.—November 22nd. Posts and Telegraphs Department. Lead-covered cable. (T. 28018/38.)*

Birmingham.—November 23rd. Electric Supply Department. All-insulated switch-fuses for twelve months. (October 28th.)

Bury.—November 24th. Education Committee. Electrical installation at the new technical college. (November 4th.)

Carlisle.—December 2nd. Electricity Undertaking. Extra-high, high and low-voltage p.i. lead covered cable. (See this issue.)

Coalville (LEICS).—U.D.C. Town waterworks to be electrified at a cost of £2,000. Town Clerk.

Dartmouth.—November 30th. Corporation. Two turbine booster pumps, to be driven either by heavy oil engines or electric motors. Town Clerk, Guildhall (deposit £1).

Dundee.—November 21st. Corporation. Electric lighting installation at Broughty Ferry housing estate. Town Clerk.

Hazel Grove and Bramhall.—December 7th. Electricity Department. One 250-kVA and two 150-kVA transformers. (See this issue.)

Hornsey.—November 26th. Electricity Department. Installation of electrode boiler central heating plant at the electricity showrooms proposed to be erected in the Broadway, Crouch End. (November 11th.)

India.—CAWNPORE.—January 2nd. Municipal Board. Electrically operated flocculators and sludge-collecting mechanism (deposit £2 2s.). Electrical pumping machinery for the unfiltered water-pumping station at Bhairon Ghat (deposit £2 2s.). Electrical pumping machinery for the filtered water-pumping station at Benajhabar. Williams, Temple & Bartholomew, consulting engineers, 28, Victoria Street, Westminster, S.W.1 (deposit £2 2s.).

BOMBAY.—November 30th. Bombay, Baroda and Central India Railway Co. Plates and separators for train lighting accumulators and gasfilled and vacuum tungsten filament lamps. (See this issue.)

London.—ST. MARYLEBONE.—November 22nd. Borough Council. Power and lighting indoor-type transformer groups and high- and low-voltage switchgear for indoor transformer stations for twelve months. (November 11th.)

Maidstone.—November 26th. Kent County Council. Electrical installation in connection with third scheme of development at Leybourne Grange Colony. County architect, Springfield (deposit of £5 5s.).

Morley.—November 22nd. Housing Committee. Electrical work at fifty-four houses and eight flats on the Hill Top estate, West Ardsley. E. V. Finnigan, Town Clerk, Town Hall (deposit £2 2s.).

New Zealand.—WELLINGTON.—February 14th. Public Works Department. Remote control, supervisory and recording equipment. (T. 28512/38.)*

February 14th. 11,000-V metal-clad switchgear and accessories for Invercargill sub-station. (T. 28803/1938.)* Post insulator units and adaptors. (T. 28802/1938.)* One electric travelling crane. (T. 28799/1938.)*

February 14th, 21st and 28th. Transformer banks and spares (six separate contracts). (T.Y. 28801/38.)*

December 15th. Posts and Telegraph Department. Twelve 5,000-V DC fixed mica condensers. (T. 28503/1938.)*

January 6th. 15,000 telephones. (T. 28497/38.)*

January 24th. Cadmium copper wire. (T. 28506/38.)*

January 25th. One mile of star quad cable. (T. 28498/38.)*

February 9th. 200 miles of tinned copper wire. (T. 28798/38.)*

Preston.—November 25th. Electrical installation at a new school at Brierfield. S. Wilkinson, architect, Lancashire County Council Offices (deposit £2 2s.).

Rochdale.—November 22nd. Electricity Department, AC 5-A and 25-A quarterly and prepayment meters for twelve months. (October 28th.)

Ruthin.—December 20th. Denbighshire County Council. Installation of electric lighting and intercommunication telephones, &c., at the County Offices extensions. Clerk of the County Council, County Offices (deposit £5).

Scarborough.—November 22nd. Corporation. Complete installation of electrically driven pumping machinery in connection with the Cayton Bay waterworks extension. H. V. Overfield, borough and water engineer, Town Hall (deposit £2 2s.).

South Africa.—PRETORIA.—December 8th. Union Tender and Supplies Board. Switchboards. (T.Y. 28272/38.)*

Union Tender and Supplies Board. December 8th. Electrical conduit fittings including bends, tees, couplings, boxes, bushes, saddles and backnuts. (T. 28924/1938.)*

December 8th. Stoves of all kinds, spares and parts for twelve months. (T. 28922/38.)*

Sunderland.—Town Council. Electrical installation at the Hendon Road baths. J. E. Lewis, Town Hall.

Wakefield.—November 21st. West Riding County Council. Installation of electric lighting at Bentley Toll Bar school. Clerk of the County Council, County Hall.

December 5th. Installation of electric lighting in the extensions at Hebden Bridge grammar school. Clerk of the County Council.

West Ham.—November 28th. Electricity Department. Coal for the generating station for twelve months. (November 11th.)

Orders Placed

Ayr.—County Council. Accepted. Electrical work at the central hospital at Kilwinning (£13,332).—Woodward, Sons & Co.

Barrow-in-Furness.—Electricity Committee. Accepted. Cable to Millom (£5,747).—Siemens Bros. & Co.

Beccles.—Town Council. Accepted. Electrical pumping plant at the sewage works (£203).—Pulsometer Engineering Co.

Cheshire.—Health Committee. Accepted. Electrical installation at Clatterbridge institution (£6,841).—B. French. Electrical installation at County Offices (£9,745).—Coleman, Ltd.

Darlington.—Town Council. Accepted. Equipment for the electric lighting of Yarm Road (£891).—B.T.H. Electrical installation in Council houses (£1,414).—Henderson & Priestly.

Durham.—County Council. Accepted. Shire Hall Council Chamber: Electric lighting fittings (£157).—G.E.C. Wiring (£40).—T. Henderson.

Ealing.—Education Committee. Accepted. Wiring new block at Coston senior girls' school (£342).—Springvale Electric Co.

Glasgow.—Cleansing Committee. Accepted. Electric locomotive (£317).—Hudswell Clark & Co.

London.—Metropolitan Water Board. Recommended. Oil engine driving a centrifugal surface pump and electric generator, and an electrically driven borehole pump, for Wansunt pumping station.—Brush Electrical Engineering Co. (engine); Mirrlees Watson (pumps).

L.C.C.—Supplies Committee. Accepted. Electric lamps for twelve months (approximately £12,000).—Siemens Electric Lamps & Supplies.

Wiring and fittings for the installation of electric lighting and power, fire alarm and clock systems in waiting hall, mortuary and nurses' home at Heatherwood Hospital, Ascot, Berkshire:

	£		£
Springvale Electrical Co. Accepted	**612**	L. G. Tate & Co.	681
Read & Partners...	649	Johnson & Tanner	694
F. H. Wheeler & Co.	669	Alexander Hawkins & Sons ...	699
F. G. Edey & Co...	673	W. H. Gaze & Sons	699
Arthur Cozens	679		

Provision and erection of an electric passenger lift in the nurses' new home and an electric bed lift in the new ward block at St. Nicholas' Hospital, Plumstead:

	Passenger lift.	Bed lift.		£	£
	£	£	Evans Lifts	1,136	1,227
			Pickerings	1,160	1,415
Express Lift Co. Accepted	**1,078**	1,259	Marryat & Scott	1,204	1,460
Newbury & Thomas. Accepted	1,090	**1,185**	Glasgow Engineers ...	1,204	1,403
Etchells, Congdon & Muir	1,130	1,360	J. & E. Hall	1,355	1,495
Gimson & Co. (Leicester)	1,134	1,270	Bennie Lifts	1,356	1,424
			Waygood-Otis	1,369	1,442

Provision and erection of electric bed lift in the new maternity block at St. Pancras Hospital II:

	£		£
Express Lift Co. Accepted ...	**1,106**	Waygood-Otis	1,319
Newbury & Thomas	1,140	Pickerings	1,324
Etchells, Congdon & Muir ...	1,197	Bennie Lifts	1,340
Gimson & Co. (Leicester)... ...	1,198	J. & E. Hall	1,360
Evans Lifts	1,210	Marryat & Scott	1,375
Glasgow Engineers	1,279		

Wiring and fittings for electric lighting, power, telephones, fire alarms and domestic bells in the new nurses' home at St. Francis' Hospital, Dulwich:

	£		£
Archibald Meckhonik. Accepted	**1,939**	A. J. Hewens & Sons	2,368
Holliday & Son (Electrical) ...	2,108	Davis Myer & Co.	2,372
Troughton & Young	2,139	Buchanan & Curwen	2,391
Electrical Installations	2,156	Newman & Watson	2,446
Atozed (London), ...	2,209	G. E. Taylor & Co.	2,449
F. Troy & Co.	2,222	L. G. Tate & Co.	2,717
Pinching & Walton	2,270	Warren Smith & Co.	2,791
Francis Polden & Co.	2,299		

Provision and erection of an electric passenger lift in the new nurses' home at St. Francis' Hospital, Dulwich:

	£		£
Glasgow Engineers. Accepted ...	**1,157**	Marryat & Scott	1,293
Express Lift Co.	1,169	Keighley Lifts	1,330
Gimson & Co. (Leicester) ...	1,180	Wm. Wadsworth & Sons ...	1,352
Aldous & Campbell	1,200	Waygood-Otis	1,386
Evans Lifts	1,230	Pickerings...	1,390
Bennie Lifts	1,268	J. & E. Hall	1,562
Etchells, Congdon & Muir ...	1,285		

Electrical installation at the White Oak Hospital, Swanley:

	£		£
Read & Partners. Accepted ...	**2,872**	Bower Engineering Works (Electrical and General)	3,546
W. J. Furse & Co. (London) ...	3,002	Warren Smith & Co.	3,607
Electrical Installations	3,017	H. J. Cash & Co.	3,650
Springvale Electrical Co. ...	3,028	Pinching & Walton	3,669
Berkeley Electrical Engineering Co.	3,089	Buchanan & Curwen	3,719
Francis Polden & Co.	3,151	W. H. Gaze & Sons	3,823
G. E. Taylor & Co.	3,291	Newman & Watson	4,112

Lowestoft.—Town Council. Accepted. Electrical installation

at the Isolation Hospital: Cubicle block (£86).—B. Barber & Son. Ward block (£26) and administrative block (£83).—Lowestoft Electrical Co.

Romford.—Essex County Health Committee. Accepted. Electrical installation at Oldchurch Hospital (£530).—Electrical Installations.

Stockton-on-Tees.—Town Council. Accepted. Transformer for the Durham Road kiosk.—Crompton Parkinson. Meter testing equipment.—Ferranti.

Worcestershire.—Education Committee. Accepted. Electrical installation at Blackminster senior school (£249).—Abell & Smith's Electrical Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors

Ashington.—Alterations to Wallaw Cinema for Wallaw Cinemas, Ltd.; P. L. Browne, Son and Harding, architects, Pearl Buildings, Newcastle-on-Tyne.

Banff.—Bank premises, High Street, for National Bank of Scotland, Ltd.; A. J. Morris, architect, High Street, Elgin.

Becontree.—Houses; L.C.C. architect, County Hall, Westminster Bridge Road, London, S.E.1.

Bedlington.—Council offices; U.D.C. surveyor.

Birmingham.—Works and offices, Birchall Street, for the Constructional Engineering Co., Ltd., Titan Works.

Bournemouth.—Eleven shops and flats, Hillview Road; Davis Estates, Ltd. Extensions to Alma Road school (£13,666); F. A. Grigg & Sons.

Brighton.—Flats (72), Dyke Road; P. H. Caspari, architect, 102, Baker Street, London, W.1.

Bristol.—Houses (162), Novers estate; E. A. W. Poole & Son. Baths, Horfield; city engineer. Rebuilding premises, Queen Street; Pencocks Stores, Ltd. Premises, Redcliffe Street, for the Bristol Motor Co., Ltd.

Brynmawr (BRECKNOCKSHIRE).—Houses (78), Twyncyghordy site; U.D.C. surveyor.

Castle-Douglas.—Operating theatre, radiology department, &c., Cottage Hospital; the superintendent.

Cheadle (STAFFORDSHIRE).—Shopping centre, Froghall Street; C. R. Bratt, Kingsley Hall estate.

Crook.—Cinema, South Street, for S. Sheckman, managing director, Essoldo Theatres; J. H. Morton & Son, architects, Newcastle-on-Tyne.

Darlington.—Houses (10), Neville Road; H. Parvin & Son, builders, 17, Horsemarket. Hotel, for the Edlinton Hotels, Ltd.; E. M. Lawson, architect, Barras Buildings, Barras Bridge, Newcastle-on-Tyne.

Douglas (I.O.M.).—Factory, Chester Street; J. Felice.

Durham.—School, Pelton Lane, Newfield; F. Willey, county architect, 34, Old Elvet, Durham.

Easington Colliery (Co. DURHAM).—Club premises for the British Legion; H. G. Clarke, architect, Sunderland Road, Horden.

East Retford.—Houses, Gringley-on-the-Hill, Sturton-le-Steeple and Treswell; L. Tattersfield, architect, Amcott House, Grove Street, Retford.

Egham.—Dwellings (48), Egham Hythe; U.D.C. surveyor.

Felling-on-Tyne.—Houses (58), Windy Nook; U.D.C. surveyor.

Forth (LANARKSHIRE).—Houses (120), for the Scottish Special Areas Housing Association, Ltd.; Stellmacs, Ltd., 57, Oswald Street, Glasgow.

Gateshead.—Houses (336) and flats, Highfield estate, for North-Eastern Housing Association; F. H. Patterson, architect, Municipal Buildings. Police buildings (£150,000), alterations to Town Hall and houses, Old Ford; borough engineer.

Glasgow.—Fire station (£64,000); city architect. School, Albert site (£50,000), for the E.C.

Gravesend.—Extensions to Albion Engineering Works, Albion Parade; Doust & Co., Ltd.

Haverton Hill.—Extensions to works, Portrack Road; Imperial Chemical Industries, Ltd.

Hertfordshire.—Extensions to high school, Bishop's Stortford (£18,941), for the County E.C.

Hetton-le-Hole.—Houses (21), Murton Lane, for U.D.C.; A. H. Fennell, architect, Bridge End Chambers, Chester-le-Street.

Holyhead.—Houses (110), Newry Street; U.D.C. surveyor.

Hornchurch.—Factory, Hornchurch Road, for Roneo, Ltd.; Haines & Warwick, builders, Bradford Road, Seven Kings.

Hull.—Residential school, Court Lees Farm; city architect. School, Hopewell Road (£67,337); G. Houlton & Sons, Ltd.

Inverness.—R.C. school, King Street (£10,539); architect, County Council.

Ipswich.—Houses (44), Rope Walk; J. Gerrard & Sons, Ltd.

Lanarkshire.—Factories, Chapelhall and Larkhall, for the Industrial Estates, Ltd.; the secretary.

Lancing.—Cinema, South Street, for Luxor (Lancing), Ltd.

Leeds.—Nurses' home, Killingbeck sanatorium (£37,837); J. Tomplison & Son.

Liverpool.—Factory, Edge Lane (£150,000); Automatic Telephone Manufacturing Co., Ltd.

Llantwit Major.—Cinema; E. Loveluck, architect, Bridgend, Glamorganshire.

London.—(CAMBERWELL).—Extensions to Wilson's grammar school (£13,891); Falkus Bros. (WOOLWICH).—Factory, Eltham High Street; Page, Moore & Page, Barclays Bank Chambers, Lee Green.

Longton (STAFFORDSHIRE).—Cinema, for the Danilo Cinemas Co., 3, New Street, Birmingham.

Manchester.—Block of flats, Oxford Place, Rusholme; Oakley & Savill, architects, King Street, Manchester. Offices, Fountain Street, for the Britannic Assurance Co., Ltd., Easy Row, Birmingham; Cruickshank & Seward, architects, Princess Street, Manchester.

Middlesbrough.—Extensions to Hugh Bell school (£3,000); education architect, Woodlands Road.

Morley.—Dwellings (62), Hill Top estate, West Ardsley; borough surveyor.

Motherwell.—Baths, Wishaw (two swimming pools, £50,000); burgh surveyor, Motherwell.

Newburn-on-Tyne.—Houses (16), Chapel House estate; R. Burke, architect, Singleton House, Northumberland Road, Newcastle-on-Tyne.

Newcastle-on-Tyne.—Shops and offices, Princess Street; C. S. Errington, architect, Grainger Street.

Northumberland.—School, Ashington, for the C.C. (£11,000); county architect, County Hall, Newcastle-on-Tyne.

Ormskirk.—Houses, Iddon Road and Hutton Road, Skelmersdale; H. Cox McCulloch, architect, 629, Kingsway, Manchester, 19.

Plymouth.—Extensions to Devonport College (£11,193) for the E.C.

Preston.—Houses (29), Kay Street Mill estate, for Hawthorne Bros., Ltd.; J. Miller, architect, 14, Chapel Street.

Reading.—Houses (116), Balmore estate, Caversham; Mitchell Bros. (Reading), Ltd., builders, Caversham.

Romford.—Shops and offices, High Street, for Prudential Assurance Co., Ltd.; Baker, Hammond & Laver, builders, New Road Works, Rainham, Kent.

Rotherham.—Shops, Upper Millgate, &c. (£45,250); borough surveyor.

Rowley Regis.—Houses, Titford Property Co., Ltd., New Road, Langley, Broadwell, Worcestershire.

Ryton-on-Tyne.—Houses (19), Barmoor; Charlton & Sons, builders, Paygate, Crawcrook.

St. Helen's Auckland.—Factory, Maude Terrace; North-Eastern Trading Estates, Ltd.

Seaton Carew.—Houses, Carew site and Barns Farm; Earl of Eldon.

Sheffield.—Houses, Foxwood Avenue, Foxwood Grove and Foxwood Road; Hallewell Estates, Ltd., Foxwood estates. Houses (102), Woodhouse estate; W. Memory & Sons, Ltd. Saleshops, offices, workshop and stores, Bridge Street; W. & T. Avery, Ltd., Soho Foundry, Smethwick, Birmingham.

Spennymoor.—Shops and showrooms, Cheapside, for Hardy & Co.; J. N. Fatkin, architect, 17, Bigg Market, Newcastle-on-Tyne. Enlargement of secondary school (£30,000); T. Manners & Sons, Ltd.

Stockton-on-Tees.—Garage and showroom, Yarm Lane, for Charles Newman, Ltd., and shops, Norton Road, for the Economic Laundry, Ltd.; G. P. Stainsby, architect, 25, High Street.

Stoke-on-Trent.—Cinema, Wellington Road, Bucknall; A. Glyn Sherwin, architect, Rectory Chambers, Newcastle-under-Lyme.

Stretford.—Factory, Brixham Road; J. Holt architect, 49, Deansgate, Manchester.

Sunderland.—Houses (62), Ryhope Street; R.D.C. surveyor. Factory, Grangetown, for the Hendon Paper Works Co., Ltd.; W. & T. R. Milburn, architects, 17, Fawcett Street, Sunderland. Alterations to premises, Shore Street and Monk Street, for Youngs Motors, Ltd.

Tipton (STAFFORDSHIRE).—Houses (400), Upper Church Lane; Whittingham, Ltd., builders, Victoria Street, Wolverhampton.

Tunbridge Wells.—Operating theatre, County Hospital, Pembury; county architect, Springfield, Maidstone.

Twickenham.—Extensions to factory, for The British Anzani Engineering Co., Windmill Road.

Walsall.—Houses (72), Green Rock Lane; Dickinson & Holford, Ltd. Shops and flats, Lower Rushall Street; borough engineer.

Washington.—Houses and shops; E. R. Willey, builder, Victoria Road.

West Hartlepool.—Houses and bungalows near Elmwood Road; Watt Brothers, builders, 210, Park Road.

Wigtonshire.—School, Stranraer, for the County E.C. (£10,000); county clerk, Stranraer.

Wolverhampton.—School, Prestwood Road (£38,486); A. M. Griffiths & Son, Ltd. Extensions to factory, for C. H. Edwards, Ltd., Millfields.

Worcestershire.—School for rheumatic children; C. Martin, architect, Birmingham. School, Tenbury, for the County E.C.

Yorkshire.—School, Barnoldswick (£53,235), for the West Riding E.C.

Large L.C.C. Housing Scheme

A PLAN to develop a site at Stoke Newington at a cost of about £1,000,000 is recommended by the Housing and Public Health Committee of the London County Council. The tentative scheme provides for the erection of buildings varying from two to five storeys and comprising about 1,660 dwellings. It is hoped that preparations will be sufficiently advanced by the end of the current financial year to enable a contract to be let for the construction of the foundations of the first block of dwellings.

Information Department

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, &c., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

LUMINAX torch and batteries for aircraft.
CONDOR lamps.
H. & B. condensers.
SVEA electrodes.
LITE lamps.
DETECT watchmen's clocks.
BESTRON twin-filament lamp.